THE ROYAL SOCIETY

BRITISH ACADEMY
for the humanities and social sciences

Call for Views: Individual Responses

The responses in this document are reproduced verbatim. Please note that not all respondents answered every section of the Call for Views, or all questions within each section. The original complete survey is provided in the Appendix.

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Dr Alice Bradbury

Summary of main points

Please provide a brief summary (e.g. a list of bullet points), of not more than one side of A4, of the essential messages you are conveying in your response.

- Research on education policy and particularly its impact on existing inequalities is vital; however, the ability to convey findings in my field is limited by our ability to communicate them to policy-makers and have influence. This is often due to research being critical of government policy.
- Nonetheless, recent work with teachers' trade unions has had a definite impact on policy, suggesting that creating better links with lobbying organisations would be effective.

Questions for researchers

1. What broad area of educational research do you work in, and what is your role?
   I am a Senior Lecturer in Sociology of Education; my work is focused on education policy and its interactions with inequalities by race, class and gender.

2. Describe the contribution your field has made to educational research, policy, teaching and learning, and society?
   Providing research on the impact of policy on schools, teachers and children. For example, I undertook a project in late 2015 on Baseline Assessment, a new policy which involved testing four-year-olds as they started school. The research report (published here http://www.teachers.org.uk/files/baseline-assessment--final-10404.pdf) contributed to the reversal of this policy in mid-2016. We are currently working with the unions to influence the replacement policy.

3. In the past 10 years, what would you judge as the most significant contributions your field has made?
   Research has found significant consequences of policy in terms of disparities in attainment by ethnic group, class and gender.

4. What are the priorities in your field of educational research, and what is driving these?
   Priorities in my field are currently work on new education policies (e.g. the reintroduction of grammar schools) and their social impact. Academics in my field are driven by social justice aims; the direction of our work is often determined by policy developments.

5. What particular barriers and challenges do you face in undertaking educational research, and what changes might help overcome these? Please say whether these barriers and/or challenges apply to 'blue skies' or 'applied' research.
6.
   The main barrier is securing funding for research projects, both those that are exploratory and small scale, and those that involve a large team and take several years. In particular, it is rare to secure funding to explore a new education policy in its introductory phases, as many research application processes take several months or frequently over a year.

7. What opportunities (including opportunities for dissemination) exist to deepen the contribution that your research field makes to policy, teaching and learning, and society?
   The dissemination of research in my field to policy-makers has often been stymied by a lack of political will to engage with research which describes the negative effects of policy. Therefore the contribution of my field would be hugely advanced by more positive links with policy-makers, and

with other lobbying organisations who have access to key stakeholders and have greater influence that single academics.

8. How do you disseminate your research?
   Through academic journals and conference papers; public events; speaking at national teachers' conferences; articles in education press e.g. Schools Week; national press.

9. Are there demonstrations of effective links between educational researchers, policy-makers and practitioners in this country, or internationally, that the Working Group should be aware of?
   My recent experience of working with the NUT and ATL on a project has been very successful in terms of relaying my research findings to policy-makers, and breaking down the barriers between research and policy. It has also led to better links with the DfE and other educational organisations.

Jane Oakhill and Kate Cain

Summary of main points

Please provide a brief summary (e.g. a list of bullet points), of not more than one side of A4, of the essential messages you are conveying in your response.

- Research into children's reading comprehension can make an important contribution to the effective teaching of reading comprehension in schools.
- Thus far, this research has had an impact on the National Curriculum, but teachers are not adequately prepared for how to teach the relevant skills, and do not have sufficient appropriate materials to support that teaching.
- Research funding in required to support the important applications of research in this area: In particular, to develop appropriate and accessible professional development for teachers, and to provide evidence-based (trialled) materials for teaching reading comprehension, together with guidance on, and support with, their use.

Questions for researchers

1. What broad area of educational research do you work in, and what is your role?
   We work in the area of reading research and, more specifically, children's development of, and problems with, the skills that are important for reading comprehension.

2. Describe the contribution your field has made to educational research, policy, teaching and learning, and society?
   Briefly, the research base has been important in influencing policy (e.g. the recent emphasis on reading comprehension skills in the National Curriculum). It has also influenced teaching in that primary and, increasingly, secondary school teachers are becoming more aware of the need to teach reading comprehension skills to all children, from a young age, and are developing the skills to do so. Our recently-published book (Oakhill, Cain & Elbro, 2015) has been instrumental in providing teachers and other educators with an overview of the relevant research base and how it can be applied to practice, and recently-developed training programmes, such as *Inference Training* (Whatmuff/Leicester LEA) have used the research base (primarily our own work) as a foundation.

   Our research in this area has been acknowledged as being "impactful". For instance, Oakhill prepared a very highly-rated Impact Case Study for the 2014 REF, Oakhill and Cain were runners up in the 2016 ESRC "Celebrating Impact Awards" (Outstanding Impact in Society), and Oakhill

won the 2016 University of Sussex Impact Award (Policy and Practice). Cain was awarded the 2014 Samuel Torrey Orton Award by the International Dyslexia Association in recognition of the impact of the influence of her research on both theory and practice of reading development.

3. In the past 10 years, what would you judge as the most significant contributions your field has made?
   The most significant contribution has been to identify the component skills that contribute to effective reading comprehension in children, and to demonstrate that those skills (in particular, vocabulary knowledge, inference making, understanding text structure and monitoring one's own comprehension) are causally related (not just incidentally associated) with the effective development of reading comprehension in primary-school children (see, in particular, Oakhill & Cain, 2012). This body of work enables much more effective and targeted teaching of reading comprehension, since the specific underlying skills can be taught.

4. What are the priorities in your field of educational research, and what is driving these?
   The main priority now is to produce, and provide an evidence base for, effective training programmes to support the teaching of reading comprehension from an early age for all children (not just those who have specific comprehension difficulties, which are often identified only after children have been in school for several years). The need for such resources is driven by the fact that the National Curriculum now mandates the teaching of reading comprehension from Key Stage 1, but teachers typically do not have the understanding of the research base and the necessary skills to teach and support children's reading comprehension effectively. Thus, evidence-based training materials, together with relevant Continuing Professional Development for teachers, are needed to support their ability to teach reading comprehension.

5. What particular barriers and challenges do you face in undertaking educational research, and what changes might help overcome these? Please say whether these barriers and/or challenges apply to 'blue skies' or 'applied' research.
   The main barrier is access to funding. Adequate funding for the development of a comprehension training programme, and a Randomised Controlled Trial to test its efficacy, would have a substantial cost. An additional barrier is that schools are very busy with all sorts of demands, and often are not receptive to research unless they can see very immediate benefits.

6. What opportunities (including opportunities for dissemination) exist to deepen the contribution that your research field makes to policy, teaching and learning, and society?
   As mentioned above, we have published a book aimed at teachers and other education professionals, which we believe has been effective in raising awareness of the relevant research and its implications and applications. We also take the opportunity to attend conferences and smaller (more local) meetings of teachers and educational professionals, when invited to do so. A few years ago, we obtained an ESRC Seminar grant (Snowling, Nation, Cain & Oakhill, 2006), attended by academics, educators, educational psychologists, and policy makers, and produced a booklet to summarise the research base. Both were effective in disseminating our research beyond the academic community.

7. How do you disseminate your research?
   See above. We mostly publish in academic (Psychology and Education) journals, but also take opportunities, when invited, to contribute to publications that are read by teachers and educational professionals, such as *Perspectives on Language and Literacy* (see below for further details) and to speak at practitioner workshops in the UK, Europe, South America, and the US.

8. Are there demonstrations of effective links between educational researchers, policy-makers and practitioners in this country, or internationally, that the Working Group should be aware of?

Yes, there can be very effective links between researchers and policy-makers (e.g. our links with the Dept. for Education in relation to recent revisions to the National Curriculum) and also links between researchers and key personnel in local authorities or school academy networks. Such links with practitioners can be very effective in overcoming resistance to research in schools (see 5 above), and in disseminating relevant research findings to a broader community (one excellent example is the "Research2Teachers" initiative by Ash Grove Academy in Macclesfield, where researchers from both Psychology and Education are invited to present relevant research findings and their implications to teachers and other educational professionals from the area).

David Chester

Summary of main points

- There seems to be no way to influence people to listen or read about my ideas. The RS does not help (and it should!). This includes what I have been saying.
- Universities and centres of higher learning are not academically honest enough to give serious attention to many innovative ideas of a theoretical kind. Their structure favours keeping to the older syllabuses rather than to change their presentations to students. This is mostly due to their strong political structures which are dominated by a few unimaginative managers.
- In theoretical macroeconomics one cannot demonstrate better ways for society to be managed, so this subject is neglected.

Questions for researchers

1. What broad area of educational research do you work in, and what is your role?
   Providing material for teaching Macroeconomics

2. Describe the contribution your field has made to educational research, policy, teaching and learning, and society?
   My recent book about theoretical macroeconomics has converted what was a dismal, pseudo-science into a logical, sensible, more exact and engineering-type of true science.

3. In the past 10 years, what would you judge as the most significant contributions your field has made?
   The ability for teachers to present a mechanical model for getting young students involved in how our social system works, see: SSRN 2600103 "A Mechanical Model for Teaching Macroeconomics"

4. What are the priorities in your field of educational research, and what is driving these?
   To encourage teachers to better explain macroeconomics, for the future generations to make a better job of national government.

5. What particular barriers and challenges do you face in undertaking educational research, and what changes might help overcome these? Please say whether these barriers and/or challenges apply to 'blue skies' or 'applied' research.
   Both kinds of research are seriously limited and hurt by the inflexibility of the universities to accept or even agree to consider anything as new and innovative as what I have proposed (you have to be a doctorate reader in a particular subject that the university approves). This situation includes the RS who will only allow my ideas to be published as a paper and at an excessive cost. When a new science is born or claimed to be born, there should be an immediate response to find out briefly what it is and how it works or applies, and possibly to acknowledge its birth. But in fact

nobody wants to know. This attitude is destructive and in the UK it unfortunately results in the sincere claims for wanting a better educational system to become ineffective in practice.

6. What opportunities (including opportunities for dissemination) exist to deepen the contribution that your research field makes to policy, teaching and learning, and society?
   See next question.

7. How do you disseminate your research?
   Blogs, Facebook and comments on the internet including publicity for my new book and for news about my papers on economics.

8. Are there demonstrations of effective links between educational researchers, policy-makers and practitioners in this country, or internationally, that the Working Group should be aware of?
   It is fair to report that as a frustrated person with certain psychological hand-ups, my poor attempts at getting myself across are a bit of a failure. My ideas are sound but my management of them is somewhat limited. I would imagine that many would-be inventors and discoverers have this problem and that is why we are making such slow progress in (amongst other matters) education improvements. I have seen that business people rather than inventors have and do gain the most from new technology and I accept this so my book is being offered freely and anybody who wishes to gain from its information is welcome.

Megan Dixon

Questions for teachers, school and college leaders, and teacher trainers

1. How are you involved with teaching in schools and colleges?
   a. I am Director of Literacy for the MAT (multi-academy trust), working to ensure standards in literacy (reading and writing) are a good as possible.
   b. I work with trainee teaches in the Teaching School, as they learn to teach, delivering lectures and training, marking assignments and observing teaching.
   c. I am the Director of Research School for the Aspirer Research School (EEF.IEE)
   d. I am a Reading Recovery Teacher Leader – training Reading Recovery teachers

2. Have you been involved in academic educational research?
   a. Yes, in a number of ways: own study, engagement in national trials, supporting others to engage with practice

3. How have educational research findings informed your work, and how has your usage of educational research findings changed over the past 10 years?
   a. I have been involved with educational research since I gained QTS. As a teachers in my second year of teaching, I began an MTeach (IoE_UCL), completing a small practice based study. In 2011, I completed another MA (IoE_UCL) and conducted more practice based research. In my capacity as a Reading Recovery Teacher Leader, I have continued to research my practice and engage with educational research findings, publishing in the Journal of Reading Recovery. In the past 5 years, I have developed this further, supporting teachers and other practitioners to engage with findings. Initially, I mainly engaged with qualitative research studies- this has changed over the past 5 years, to include a wider range of research, including more quantitative studies. There appears to be an increasing number of empirical studies and meta-analysis (such as the work by John Hattie) which claim to know what works. I am interested in the nuances behind these studies; asking the questions what works for whom, when and in what circumstances. I feel it is important for

schools and teachers to understand how to ask these questions of the studies and be confident to assess the generalisability of the work to their own contexts. Currently, research evidence is used to justify any opinion and I feel it is important to maintain a professional scepticism about any claims, until proven otherwise.

4. How easy do you find it to identify, access and make use of educational research, and what are your main sources of educational research findings?
    a. Educational research is hard to access for teachers, unless they are enrolled in Further Education at an HEI.
    b. I use the internet mainly to find open access papers – but this has its drawbacks and can never be systematic.
    c. Academics that I have links with (such as Professor Jane Oakhill, Professor Kate Cain, Professor Cathy Burnett, Professor Steven Gorard) are very generous with their work and email me papers and often I approach academics directly if I would like to read their work (but I am aware that many do not)
    d. I use the EEF website, WWW Clearinghouse, Best Evidence Encyclopaedia and Evidence4Impact to access meta-analyses and syntheses of educational research
    e. I buy books and subscribe to some journals personally
    f. I find it easy to read educational research but I am aware that in general teachers and students do not. Research is often not written with a practitioner audience in mind.

5. Are there demonstrations of effective links between practitioners, policy-makers and researchers in this country, or internationally, that the Working Group should be aware of?
    a. We have developed strong links with Prof Jane Oakhill and Prof Kate Cain, to develop their work.
    b. The EEF model of developing national trials works well for us. It provides an opportunity for our schools to be engaged in trials and learn about and from them.
    c. We continue to develop our links across theory and practice as an EEF/IEE Research school
    d. We have started a series of Research2Teaching Seminars where we invited researchers to present a short seminar about their work and findings

6. What would be your priorities for educational research,[1] and why?
    a. Research that answers questions that practitioners have – more clearly defined links between HEIs and schools. Personally, I would like to see it become standard practice for all teachers/schools to be involved in educational research, either developing their own, or being involved in national trials.
    b. Open Access to educational journals for teachers/schools ,with commentaries for teachers
    c. Standard practice for teachers/SLT to attend conference where educational researchers present their findings (but not try to sell products), with journals published to support this.
    d. Products sold to schools (such as schemes, resources, practices etc) to have robust evidence of effectiveness and clear outlines as to when they are most effective, for whom etc.

[1] These could, for instance, be concerned with identifying research questions to be addressed to improve practice, or improving the usage of educational research.

Dr Suzanne Fergus

Questions for researchers

1. What broad area of educational research do you work in, and what is your role?
   I am a Principal lecturer in Pharmaceutical Chemistry and also a Learning & Teaching Specialist in our central Learning and Teaching unit. I have a strong interest working within chemistry education research and pedagogic scholarship.

2. Describe the contribution your field has made to educational research, policy, teaching and learning, and society?
   - Technology enhanced learning -innovative video resources to enhance understanding of conceptually difficult topics has been highly popular, e.g. a resonance in chemistry video 13000 views on YouTube with many favourable comments.
   - Student collaboration in chemistry question design using Peerwise. As a result of this initial research project, the online Peerwise tool has now extended across six different Departments.
   - Contextualised chemistry with inventive practicals and case studies and recently incorporated the current phenomenon of novel psychoactive substances (Fergus et al., 2015)
   - Authentic assessments for learning- The innovative SChemEs assessment approach (Kirton et al, 2013) focuses on developing and rewarding competency in the laboratory. This strategy is now incorporated within a biochemistry programme at Dublin Institute of Technology
   - Development of a chemistry diagnostic test for 1st year students' chemistry learning which informed teaching and adjustments to content or feedback emphasis (Fergus and Hitch, 2015).

3. In the past 10 years, what would you judge as the most significant contributions your field has made?
   - Bridging the gaps in students' understanding of chemistry concepts, working with them within their own frameworks of cognition to develop new connections in their knowledge and understanding.

4. What are the priorities in your field of educational research, and what is driving these?
   - Approaches to promote student learning gain in subject discipline. Personal interest and alignment with strategic objectives of institution and sector.

What particular barriers and challenges do you face in undertaking educational research, and what changes might help overcome these?

- Applied research, limited funding opportunities available for pedagogic scholarship which is key metric and barrier for resources.

5. How do you disseminate your research?
   Conferences, publications, seminars, social media e.g. twitter

Professor Lani Florian

As Bell Chair of Education and Director of Research and Knowledge Exchange at The University of Edinburgh Moray House School of Education, I am pleased to make this individual response to the Royal Society and British Academy Call for Views on high quality educational research. In so doing, it

seems fitting to recall the words of Scottish educationalist John Nisbet in his address to the 1974 inaugural meeting the British Educational Research Association (BERA):

…a primary function of research in education is to sensitise - to make people aware of problems. Also, in assessing the achievements of educational research, we have to consider its effect on the attitude of those who teach. Vigorous research activity or, to use a less pretentious title, investigation into teaching and learning, sharpens thinking, directs attention to important issues, clarifies problems, encourages debate and the exchange of views, and thus deepens understanding, prevents ossification of thinking, promotes flexibility and adaptation to changing demands.

What opportunities are there for educational research to fulfil this function today? In recent years, attempts to raise the status of educational research have tended to privilege research that is associated with education's foundation disciplines. Although much of this research has been of high quality, little of it has influenced teachers' classroom practice[2]. The traditional academic disciplines from which education draws, all offer important insights but to meet Nisbet's standard of educational research, their contributions to a knowledge base in education depend on the extent to which they can be integrated.

For example, understanding literacy – what it is, how it is acquired and how it can be taught, involves combining knowledge from a number of foundation disciplines in order to determine, justify and implement a pedagogical response. Moreover, any such response must also account for difficulties that some learners may encounter along the way, for example because of a learning difficulty, a language barrier or a lack of opportunity to learn. In order to prepare teachers to teach children to read, teacher educators must integrate knowledge from multiple disciplines and perspectives. In this way, education can be described as a field of study that relies on an integrative view of knowledge and educational research that *sharpens thinking about teaching and learning* is needed.

The decade long Teaching and Learning Research Programme (TLRP) represents an example of a large scale investment in educational research that can address real questions and problems in real educational settings and it is more likely to be relevant to 'users' of research such as policy makers and teachers. Such investments can provide can contribute to an integrated evidence-base on which practice can be developed.

Stephen Gorard

You ask: "How best to harness new and up-to-date research methodologies, using the latest technologies, big data and interdisciplinary approaches, to improve educational outcomes for young people in the UK and internationally."

But the questions, such as those for researchers, in your call for views do not address this query.

The major problem with UK education research is not relevance (most is), or even its engineering into public use (some great conduits). It is simply about quality. If the vast majority of ed res had not been done the world would be no worse off, and perhaps better off because of the saved opportunity costs at all stages. Funders need to wake up to this and stop promoting and rewarding rubbish. So many benefits would flow from this simple step. The poor quality is not a relativist or paradigm thing. It concerns really basic issues such as having appropriate comparison groups to make comparisons, dropping 'religious' incantations such as significance tests to encourage real thought about data, or making clear that issues of study design such as scale are independent of methods of data collection or analysis. It involves researcher integrity, clarity of expression, warrant for findings and similar entry-

[2] McIntyre, D. (2005) 'Bridging the gap between research and practice', *Cambridge Journal of Education*, 35, 3, 357-382.

level factors. But do you really have a working group able to appreciate this, and act on it? I suspect not. The questions will prompt quite a number of extravagant claims from researchers allied to complaints about non-existent barriers that are preventing the huge breakthroughs that would 'surely' occur given more time, money or whatever.

Dr Shirley Gray

Summary of main points

- Research areas include teaching, learning, curriculum and professional learning in physical education.
- Have made significant contributions to pedagogy and curriculum in Scotland and internationally.
- Lack of funding as the main barrier.
- Strong links with the profession.

Response to questions

1. Lecturer and researcher in physical education, health and wellbeing. Research areas include: physical education, curriculum, pedagogy and professional learning. Collaborative and participatory (action) research.

2. Working collaboratively with colleagues from the University of Edinburgh and beyond, I have made a significant contribution to educational research, with an extensive publication list that includes books, research articles as well as presentations at international conferences (see: http://www.ed.ac.uk/education/rke/centres-groups/pe-research. We have been the drivers of key national and international initiatives, for example, the 'Basic Moves Programme', the International Baccalaureate for Physical Education and curriculum consultation and development for the Maltese government.

Along with colleagues, other contributions include:

- Research on learner-centred pedagogies in physical education, approaches that have the potential to enhance learning, development and personal growth.

- Research on the role of physical education within the new, Health and Wellbeing curriculum. This research was the first of its kind, illuminating the process of curriculum development in Scotland, the involvement of teachers and how it was perceived by teachers.

3. The contributions to understanding the development of physical education in relation to the Health and Wellbeing curriculum. Many of these contributions can be seen in a book to be published by Routledge in 2017: Transformative Teaching and Learning in Physical Education (2017).

4. The role of physical education and the health and wellbeing curriculum in schools located in areas that have been formally identified as socially and culturally disadvantaged. This has largely been driven by the fact that there is a dearth of research that has examined the role of social and cultural diversity in the development of curriculum, pedagogy and assessment.

The role of social medial and the body in physical education. An examination of the effectiveness of critical, embodied and activist pedagogies in creating positive, safe and emancipatory experiences in physical education. This stems from research that we have carried out in this field that has highlighted the negative role that social media can play in the way that young people understand their bodies.

5. The main barrier to carrying out research in schools with teachers (applied research) is lack of adequate funding. Funding is important because many of the researchers at the University of Edinburgh have very large teaching and administration commitments. Currently, the small-scale nature of much of our research is failing to turn the heads of policy makers. Funding would also help increased capacity in the form of the recruitment of research associates and PhD students, something that is significantly lacking in our area.

6. We have a number of opportunities to make a contribution specifically to teaching and learning, given that our undergraduate and post graduate teaching is informed by our research. We work with the largest cohort of PE students in Scotland (between 90 -100 in each year over 4 years), and we have established and maintain an excellent relationship with the profession. This is largely achieved by the creation of a national network for researchers in physical education and the invitations that we extend to teachers to return to the University for various research/teaching events.

Very few opportunities seem to exist to make contributions to policy. Recently, attempts have been made to invite key policy stakeholders to engage with our research, but these calls to date have gone unanswered.

7. Conferences, feedback to teachers, publications, knowledge exchange workshops and events, undergraduate and post graduate teaching, blogs and twitter.

8. The Scottish Physical Education Research Network. This is a network of around 100 of teacher and academics with an interest in research in physical education (see: http://www.sera.ac.uk/networks/fff/).

Helen Gutner

Summary of main points

Please provide a brief summary (e.g. a list of bullet points), of not more than one side of A4, of the essential messages you are conveying in your response.

- There is clear evidence that education policy research about policy is of high quality and can impact in productive ways within education and with wider civil society.
- There are communities of researchers in a few HEIs in the UK (including Manchester) where there is a critical mass of people, however, this is not a feature across the HE system in the UK.
- There is an imperative to examine and reveal the radical and speedy reforms to the provision of public education.
- There are significant barriers that are limiting both blue skies and applied research. While there has been espoused evidence informed policy and practice, there is clear evidence that reform is not based on evidence. Examples are given in the text below.
- There are examples of partnerships between researchers and policy-makers with the potential to develop productive pathways to impact.

Questions for researchers

1. What broad area of educational research do you work in, and what is your role?
   CEPaLs was established in 2005, and works in the area of education policy with a remit to undertake policy scholarship in regard to (a) macro policy trends that are global and trans-national; (b) meso trends that are national and regional; and (c) micro trends that are local and organizational. The underpinning values for this work are located in public education and social justice in compulsory (schools) and post compulsory (further and higher education/widening participation) education. Current project themes are:

- Conceptual work on the meaning of the public and private.
- Access to education and social justice.
- The composition and practices of the professional workforce.
- The structure and reorganization of provision of educational services.
- Policy, knowledge production and knowledge actors.
- Quality processes and globalization.

CEPaLs is an integrated community of professional researchers, doctoral researchers and alumni. CEPaLs is chaired by Professor Helen M Gunter, and with a core group of six researchers/lecturers.

In the HEFCE REF2014 report to the University of Manchester regarding the UoA25 (Education) entry identified this research as an area of strength. Our research has received national and international recognition and awards for excellence.

2. Describe the contribution your field has made to educational research, policy,[3] teaching and learning, and society?
   The field of education policy studies is national with key centres of excellence (e.g. UCL Institute of Education, Manchester Institute of Education) and international, where major contributions have been made regarding:
   - Independently funded empirical projects regarding policy design and enactment, with data sets.
   - Independently funded doctoral empirical projects (full and part time EdD and PhD) regarding policy design and enactment.
   - New conceptualisations of policy processes regarding design and enactment.
   - Mapping the underpinning ideological claims and values regarding policy design and enactment.
   - Mapping the networking and exchange relationships within and between policy actors who are located within and external to public institutions.
   - Partnerships with the profession regarding MA and Doctoral projects, at conferences/workshops, within educational settings (schools, colleges and universities), funding from professional organisations, and feedback at conferences/workshops.
   - Impacts on professional identities regarding role and contribution at a time of rapid change.

3. In the past 10 years, what would you judge as the most significant contributions your field has made?
   - Enabling education professionals to understand the reform processes, and the way that their role and practices are being changed in order to enable privatisation of public education services.
   - Providing major data sets that enable future researchers to understand the realities of working in and for public education services.
   - Obtaining independent funding (e.g. British Academy, ESRC) in order to ensure robust primary research.
   - Identifying, mapping and promoting plurality within knowledge production for and about policy changes in ways that speak to and challenge narrow policy remits and claims.

4. What are the priorities in your field of educational research, and what is driving these?
   - To examine the challenges for and the dismantling of public education, and the restoration of private interests and profit.
   - To chart and understand the knowledge production processes within and for privatisation.

[3] This need not necessarily be limited to educational policy.

- To chart and reveal other forms of knowledge production with alternatives for public education services.
- To undertake inter-disciplinary research with sociology and political science in particular.

The driver for this is located in the rapid and radical reforms taking place, and the lack of evidence supporting them. See number 5.

5. What particular barriers and challenges do you face in undertaking educational research, and what changes might help overcome these? Please say whether these barriers and/or challenges apply to 'blue skies' or 'applied' research.
    - The failure of policy makers to engage with their own commissioned research, and hence the failure to adopt an authentic evidence-informed policy process. For example, Gunter was co-director of the *Transforming the School Workforce Pathfinder* project in the early part of the 2000s. The reforms to the school workforce took place before the scheduled end of data collection (it was an agreed measurement study with baseline and end of project questionnaires in 32 schools) and the publication of the findings. This impacts on applied research.

    - The interference of policy makers with those who are contracted to undertake commissioned research. For example, Gunter and Thomson (Nottingham) undertook some scoping work regarding researcher experiences of contracts with the Department. Mixed experiences were described but with a strong trend of interference with design, analysis and the reporting of findings. See: Gunter, H.M. and Thomson, P. (2006) *Stories from the field of commissioned research*. Paper presented to the British Educational Research Association Conference, University of Warwick, September 2006. This impacts on applied research.

    - The failure of policymakers to treat researchers with respect. This impacts on blue skies and applied research. For example, Gunter is one of the Professors who signed the letter about the reform of the curriculum that Gove then described as 'enemies of promise' and 'the blob' - this is unpleasant and unacceptable conduct; there are other examples of attacks on educational researchers.

    - The failure of policymakers to commission high quality evaluations. The reports about the quality of education research in the 1990s/2000s (e.g. Hillage et al, Hargreaves, Tooley with Darby) took an ideological, selective and high critical position regarding the issues that the education research community recognised needed addressing. This impacts on blue skies and applied research. For example, the focus was on forward tracking or how a project impacted on practice. However, evaluations in Australia have demonstrated the validity of backward tracking, or how investigating practice in a school can be tracked back to research. A discussion article has been published regarding this matter: Ribbins, P., Bates, R. and Gunter, H.M. (2003) Reviewing research in education in Australia and the UK: evaluating the evaluations. *Journal of Educational Administration*, 41 (4), 423-444.

    - The control over what is and is not acceptable research by policymakers. For example, the UK government set up the National College for School Leadership in 2000, and the current government is winding it down. The NCSL had an agenda to control research and a remit to use evidence in support of delivering government policy through training. The NCSL impacted on knowledge production regarding methodology and methods, and sought to include/use particular types of knowledge claims. Literature searches and other projects were based on narrow approaches to knowledge, where plurality within knowledge production tended to be regarded as disruptive and so excluded. Gunter's offer to report on significant findings from an ESRC project was not taken up. Other researchers have confirmed anecdotally that they

have experienced this. A full account of the ESRC project is reported in: Gunter, H.M. (2012) *Leadership and the Reform of Education*. Bristol: The Policy Press; and Gunter, H.M. (2016) *An Intellectual History of School Leadership Practice and Research.* London: Bloomsbury Press. This impacts on blue skies and applied research.

- The preference for templates for delivery by policymakers and their contracted agents (including professionals in schools, colleges and universities). The UK government continues to demonstrate a preference for consultants and consultancy that can be contracted to deliver services through pre-designed templates. Such templates enable complex processes within organisational and classroom activities to be subject to simplistic listing and description. Our work on consultants and consultancies demonstrates this in action in regard to school leaders, and curriculum changes such as literacy. A full account of the British Academy funded project is reported in: Gunter, H.M. and Mills, C. (2017) *Consultants and Consultancy: the Case of Education*. Cham, Switzerland: Springer. This impacts on blue skies and applied research.

- This preference for template outcomes combined with contracted consultancy has created a climate in which access to educational sites is becoming very difficult. There are a number of features to this: (a) inability to gain access full stop – requests do not even receive a polite refusal, and the diversity of school ownership means that private decisions can be made to prevent access for public research projects; (b) if researchers gain access there can be limited understanding of what primary research actually means – the profession are so used to being audited they do not always realise that they have a professional knowledge that is interesting and important. We have published about this issue: Gunter, H.M., Hall, D. and Mills, C. (eds) (2014) *Education policy research: design and practice at a time of rapid reform*. London: Bloomsbury. This impacts on blue skies and applied research.

- There are insufficient funds for blue skies research for UK Research Councils, and the cuts to the Research Councils means that even exceptionally important research is not funded. We spend a lot of time writing bids, and then receiving positive feedback reports on bids but with no funding available. Funding is being channelled through EEF with an emphasis on RCTs to produce data about best practice and what works. This is limiting for both blue skies and applied research.

- There are consultations from policy makers that do not allow access to research evidence that can support and enable policy. For example the current “Schools that Work for Everyone” consultation is narrow and limited where the Green Paper does not draw on the range of research evidence available. For example, there is no research evidence in support of the expansion of grammar schools, particularly no evidence that grammar schools enable social mobility. There is no opportunity in the consultation to either demonstrate this, or to provide alternative evidence about the positive achievements of comprehensive schools. This impacts on applied research.

6. What opportunities (including opportunities for dissemination) exist to deepen the contribution that your research field makes to policy, teaching and learning, and society?
    - Continue to publish high quality research in a range of sites.
    - Seek clarification on the evidence base for policy decisions from your MP.
    - Attend professional events in order to provide research evidence and widen debates.
    - Use social and traditional media to not only hold policymakers to account but also to provide evidence of plurality and alternatives.

- Work with education and school professionals on the development of the evidence base in support of localised policymaking.
- Work with education and school professionals on postgraduate MA and Doctoral programmes.

7. How do you disseminate your research?
    - Workshop sessions and conference talks with professionals and parents.
    - Social media
    - Podcasts
    - Blogs
    - Letters and short articles
    - Research articles in scholarly journals.
    - Chapters in edited collections and handbooks.
    - Postgraduate MA and Doctoral teaching and supervision.
    - Scholarly networks and informal connections that are national and international.

8. Are there demonstrations of effective links between educational researchers, policy-makers and practitioners in this country, or internationally, that the Working Group should be aware of?
    - Gunter's work with the University of the First Age regarding the impact of pedagogic research on professional knowledge and practice.
    - Gunter, Thomson and McGinity's student voice and localised policymaking work with Kingswood High School (anonymised name) regarding alternative forms of school improvement.
    - You should look at the following: (a) Thomson's (Nottingham) work on creative arts with the Tate; (b) Fielding'[s work on student voice; (c) this book reports on a range of projects that impact and outline partnerships: Wrigley, T., Thomson, P. and Lingard, B. (eds) (2012) *Changing Schools, Alternative Ways to Make a World of Difference*. Abingdon: Routledge.
    - You should look at Norway regarding how the state funds doctoral studies with a living wage – this enables professionals to undertake full time doctoral study and make the transition into university and back into schools.

Robert Hagan

Questions for teachers, school and college leaders, and teacher trainers

1. How are you involved with teaching in schools and colleges?
   I am a Science teacher in my fifth year of teaching. I have a role as the 'Leading Edge Science Coordinator', tasked with bringing current scientific research into the classroom.

2. Have you been involved in academic educational research?
   I have carried out educational research as part of my PGCE and was awarded PGCE with distinction. Otherwise my experience has been as a user of research in the classroom.

3. How have educational research findings informed your work, and how has your usage of educational research findings changed over the past 10 years?
   I have tried wherever possible to search for evidence based approaches to use in the classroom, I have then applied these to teaching subjects and taken advantage of opportunities to swap tasks that I would otherwise have used for evidence based approaches that cover the same area. I also make use of evidence based approaches in my longer term planning, trying to ensure that I am following an evidence based approach if I am aware of one.

4. How easy do you find it to identify, access and make use of educational research, and what are your main sources of educational research findings?
   Through social media (mainly Twitter where I follow many persons involved in education) it is easy to find individual research pieces. I also have been able to find some evidence based approaches through books (e.g. Evidence Based Teaching A Practical Approach by Geoff Petty). However, it is difficult and cumbersome to try and actually carry out a systematic search for research work regarding a particular topic from scratch. I am not aware of a single search engine that I can use that will find me all the research papers on a particular topic, instead I have to use several search databases and even then I will not have covered the entire research base.

5. Are there demonstrations of effective links between practitioners, policy-makers and researchers in this country, or internationally, that the Working Group should be aware of?
   None that I am aware of.

6. What would be your priorities for educational research,[4] and why?
   As someone who wishes to make use of Educational research as an individual by far the biggest hindrance is the lack of a single research database that would be able to search all published, peer reviewed academic journals. The absence of such a database means that the time taken to carry out a full search would be at best excessive and most likely it is unachievable. Whilst I might be able to find individual papers related to an area I am interested in, I am often lost as to whether there is aa more significant paper or meta-analysis available on the same topic (indeed I am not aware of a single meta-analysis available on any topic in education, although I assume they do exist). As an individual my priority would be a searchable database of all educational research akin to Pubmed which I used successfully in ten years of working in Scientific academic research, I find it difficult to see how teachers will ever be able to carry out a full search of the available evidence without such a database.

   The next challenge is to address the problem of the fear of criticism of classroom practice within the teaching world. My own background in research science has left me with a huge appreciation of the value of criticism of my work, but I know teachers currently do not take criticism well. Until teachers are willing to accept criticism of their methods, educational research will remain wasted. Research has to highlight failings and problems and we have to accept those concerns. A perfect example being the DISS project (http://maximisingtas.co.uk/research/the-diss-project.php) where school staff are seemingly terrified of presenting the findings honestly and frankly for fear of upsetting the Teaching Assistants within the school (despite the group behind the work making it clear that they were highlighting that support staff were valuable, but their research showed that they were not being utilised effectively).

   Teachers also need to be educated to become aware of how research works. I have attended training where perfectly valid research findings have been demonstrated only to have the person presenting them announce that they have been superseded by more recent work when in fact the original paper was more rigorous and had sounder methodology. The only reason for accepting the newer research was that it was more recently published. Similarly, anecdotal information is seen by many as more valuable than educational research data.

   Finally, education needs to tackle a problem that was faced by evidence based medicine in its early days, that of the appeal to authority. Just as medicine had its authority figures who were looked up to and seen as persons not to be questioned, the same problem exists in education

[4] These could, for instance, be concerned with identifying research questions to be addressed to improve practice, or improving the usage of educational research.

currently where if the right person says something, many believe it to be true despite a lack of evidence. The educational world needs to be aware that the views of these authority figures should be as open to challenge and should require the same level of academic rigour as the views of any other person, but that is not currently the case.

Dr Claire Haresnape Tyson

Questions for teachers, school and college leaders, and teacher trainers

1. How are you involved with teaching in schools and colleges?
    a. I am a science teacher at an academy in Kent and I am also a Teacher Researcher, my line manager for research is the Head of History.

2. Have you been involved in academic educational research?
    a. I have completed a PhD in clinical pharmacology and I have found that there were many transferrable skills that can be applied to academic educational research. My line manager has an MA from Canterbury Christchurch University.

3. How have educational research findings informed your work, and how has your usage of educational research findings changed over the past 10 years?
    a. As a school we are interested in two aspects, firstly applying published research to our own practice and secondly, measuring the impact of interventions. We encourage staff to develop their own action research projects as part of our staff development.

4. How easy do you find it to identify, access and make use of educational research, and what are your main sources of educational research findings?
    a. We receive many emailed updates (for example, Best Evidence in Brief, Innovate my School) and attend professional leadership and development events. We do not have free access to all published research. Twitter is a useful source of contacts and ideas

5. Are there demonstrations of effective links between practitioners, policy-makers and researchers in this country, or internationally, that the Working Group should be aware of?
    a. There do not appear to be effective links that we can access easily apart from the ResearchEd conferences. Funding for a Kent hub was withdrawn after we completed a lengthy application process last year.

6. What would be your priorities for educational research,[5] and why?
    a. Retention and Training of Staff to become effective and happy teachers.
    b. Improved outcomes for students and their communities
    c. Manageable workload and quality of life for staff and students
    d. Greater opportunities for reflection and cycles of change based on action research.
    e. Providing students with opportunities to do research and become a participating voice in research.

[5] These could, for instance, be concerned with identifying research questions to be addressed to improve practice, or improving the usage of educational research.

Dr Katherine J Haxton

Summary of main points

Please provide a brief summary (e.g. a list of bullet points), of not more than one side of A4, of the essential messages you are conveying in your response.

- Educational research is as diverse and subject to the same concerns about reliability as all other kinds of research.
- The interface between educational research, policy and practice must be bridged by evidence based research in a comparable manner to evidence based medicine
- Educational research, by its nature, may lead to successful methodologies and interventions that are highly local in nature, discipline or level specific, or dependent on the force of character of the teacher to achieve. This must be accounted for.
- Educational research could be subjected to a similar form of meta-analysis as medical research (Cochrane reviews: http://www.cochrane.org/) before being used to influence policy and practice at national levels. This would ensure broader evaluation of methodologies that are more robust being recommended. The BEME Collaboration (http://www.bemecollaboration.org/) could be used as a model for such an initiative.
- Recognition of education researchers of all types should be enhanced to increase the visibility and impact of such work. Parity with other forms of research (in broad REF and funding terms) but with a strong emphasis on dissemination, reproducibility and broad applicability should be required.
- The long-term impact of research on policy must be studied and used to enhance and improve future initiatives: research must not be used as a sole driver of further turbulence in the education system in the UK. There must also be a comprehensive mechanism to remove problematic ideas if proven to be harmful.

Questions for subject associations

1. How do educational research findings inform your work?
   As a chemistry lecturer, educational research findings regularly inform my practice. I use ideas published in Chemistry Education journals or presented at conferences on a regular basis. I am selective in what I use, attempting to use those ideas that are more grounded in evidence or that fit with the specific circumstances of my teaching.

2. How easy do you find it to identify, access and make use of educational research, and what are your main sources of educational research findings?
   Chemistry Education Journals, however I find a great deal of research has methodological flaws or hyper-local context making it difficult to pull into my teaching practice. Chemistry education research is as flawed and prone to bias as all other research and this must be addressed.

3. What would be your priorities for educational research, and why?
   See bullet point summary above.

4. Are there demonstrations of effective links between practitioners, policy-makers and researchers in this country, or internationally, that the Working Group should be aware of?
   Not that I am aware of.

Paul Kiff

My view is that the future of educational research has been severely damaged by the decision to transfer teacher training out of Universities, political interference in education policy leading to the shutting out of politically unpopular but accurate educational research and simple denial of funds.

Teaching methods are seriously dominated by the over-simplistic views of a few popular but totally unscientific hawkers of stupid educational ideas.

Much of this is because of the way that the use of SATS scores to reward and punish head teachers has led to grotesque distortions in school management and teaching philosophy.

Cunning SAT score manipulators have come to dominate school management and cause the demise of proper teacher training so that there is very little scope for worthwhile educational research either to be done or passed on to teachers.

On top of all this, the calibre of a high proportion of British educational research is severely disfigured by appalling research methods and totally inept use of statistics in many places. Even institutions with good reputation have produced some dreadful research reports.

Marilyn Leask

Dear colleagues,

I am writing with respect to your review on educational research.

This review has been done before by the Training and Development agency for schools working with the other government departments and agencies and there have been endless smaller studies into what to do. David Gough who is on your panel was one beneficiary of funds for the systematic review strand of the £20m knowledge management strategy that was developed and operationalised. A new approach to reviewing is being developed and tested to resolve some of the issues of duplication and accumulation of knowledge.

The problems about finding, using, sharing, creating and managing research are well known and documented. Coherent action is what is required. But who should lead is the challenge?

Are you planning to move to action? To mobilise funds and energy? An international network of teacher educators and professional associations has been formed to do this. If you want to be involved in action please get in touch. You can see one aspect of the approach outlined on www.meshguides.org and a report on realistic actions has been prepared to send to UNESCO as the research shows the problems of access cannot be solved by the UK operating alone.

Emma Owen Davies

Questions for teachers, school and college leaders, and teacher trainers

1. How are you involved with teaching in schools and colleges?
   Directly: as an independent school we cover from EYFS through to KS5 qualifications, and therefore are delivering curriculum to our students and engaged with quality assurance for our teaching staff. In my role, I act as Assistant Head teacher linked to teaching and learning, therefore am working across our prep and senior sites.

2. Have you been involved in academic educational research?
   Speaking on behalf of my organisation we have not yet completed any independent research, but are looking at building a more research informed community. We are involved in a research project which has recently started through the GDST in October 2016, to complete a project and look at the impact on a whole school level.

   Personally, I have conducted some small scale research as part of my MA in Education, and have shared this in my dissertation. This research was quoted in a publication linked to Religious Education delivery and training.

3. How have educational research findings informed your work, and how has your usage of educational research findings changed over the past 10 years?
   As a school – there has been use of data used through the GDST network and compiled by leaders such as Kevin Stannard and the leadership centrally through the organisation. There have been considerable changes in the school over the past 10 years which have been initiated linked to wider research in some instances.

   Personally, I have used research findings – such as the toolkit from the EEF/Sutton Trust, papers in journals, links through BELMAS for example and attended events such as ResearchED - to improve the quality of my teaching. This has in turn had an impact on the choice of strategies which I have employed in my class room and as a Head of Department. During my PGCE in 2004, research was informing the practice and methodology throughout my training, but this did phase out within my initial years in post. I would estimate that it was not until my fourth year as a teacher in school that I returned to look for reading and academic literature, which then helped me to return to a more reflective approach and pursue further academic qualifications. Post MA, I have continued this through use of social media and online journals for example.
4. How easy do you find it to identify, access and make use of educational research, and what are your main sources of educational research findings?
   As mentioned previously, I have become a member of BELMAS which is a useful stepping stone, and also use online journal articles to read around subject areas which I find interesting. There is a barrier at times to identifying the most recent research, and also an inherent cost in subscribing to some academic journals which can make it prohibitive as an individual.

   I tend to use resources such as other teachers who are interested in research – through social media/blogs/web sharing areas - in order to locate and read material, although I am conscious of the inherent bias this could lead to in my perception. Through Twitter for example there has been a number of incidents where research informed debate can become quite heated between 'progressive' and 'traditional' approaches, which I find personally quite unhelpful and lead to a lack of interest in some colleagues about the research being discussed, which is a shame as an opportunity for open and critical reflection is lost.

5. Are there demonstrations of effective links between practitioners, policy-makers and researchers in this country, or internationally, that the Working Group should be aware of?
   I am not aware of this as a classroom teacher or through my Assistant Head teacher role – the most effective networks and communities I am familiar with linked to sharing research and effective practice are:
   - ResearchED
   - #WomenED (N.B. as a grassroots organisation which has led to policy-maker interaction with practitioners, as seen in the coaching programme. I think this is an interesting way in which research informed leadership in education has been used to implement change/proactive impact in the classroom)
   - EEF/Sutton Trust

- CEBE
- NFER

6. What would be your priorities for educational research,[6] and why?
    - To make research more widely available to schools – there are so many educational blogs that it can seem hard for individual teachers to locate reliable research and data from academic sources
    - More research opportunities for teaching colleagues to develop their own research skills and to train in further related qualifications as part of individual professional development.
    - Affordable access to academic journals
    - Awareness raised of the benefits of research informed teaching
    - Research which responds to the pressing demands on teaching and learning: for example the report from the EEF linked to Marking (here and below) was useful in discussion in my school through Heads of department in developing our feedback and marking policy, but there is clearly a lack of clear and detailed research on this area as quoted in the survey itself. I think there needs to be a move towards more systematic consideration of the areas which are funded for research – for example metacognition is flagged by the EEF, but I would be very interested to see how research into this area to inform school practice is being conducted, and where.
    - More outreach from universities post training to encourage and sustain links with qualified teachers into their practice, to encourage academic work is a continuing focus for NQT and RQT
    - Opportunities for classroom practitioners to research more widely and pursue this route for CPD

Alan Paterson

I would like to mention a couple of what I would call important points of view in connection with your call for comments.

Firstly, I am of the opinion that Teachers should first and foremost be friends to their pupils. I left school in 1955 and can still remember most of my teachers because they were friendly to the pupils. I was educated to the Scottish Higher School Leaving standard and I put it down to the teachers being approachable in your time of need and not simply teaching because it was a job.

I am a qualified accountant but when I retired I studied Information Technology and became a teacher. I find that my pupils run to my classroom because I make their subject interesting and I treat my pupils as friends. During my career at the same school, I have had pupils coming to me to assist them with Maths and Science. I made sure that I did help them! And it went back to the days of me being at a very good school with a very good education system. Unfortunately that system does not exist anymore in Scotland.

What that system did was realise that all pupils are not the same! That is not racism at all – it simply is true. What I maintain is that we have academic children, artistic children, children with a musical bent, and technical children. We even have girls who are good at domestic science! However, most education systems and most teachers do not recognise this. At the Academy where I was taught, we had both a Technical College and a Domestic Science College attached to the Academy. At the Technical College, boys were taught a trade skill so that when I left school my friend who went to Technical College left school with a 4-year apprenticeship under his belt along with a fair chance of

Ref: EEF marking document:
https://educationendowmentfoundation.org.uk/public/files/Publications/EEF_Marking_Review_April_2016.pdf

getting a job, and earning just as much as I did. That is what we should aim at now. Perhaps Computer Science will go a long way towards helping that aim.

Professor Dave Putwain

Questions for researchers

1. What broad area of educational research do you work in, and what is your role?
Education Psychology Research (Just to be clear, I am using the internationally accepted definition of educational psychology research – I am not referring to research about the practice of school psychologists but the application psychological theory to education).

2. Describe the contribution your field has made to educational research, policy, teaching and learning, and society?
In the UK – virtually nil. Internationally – how very simple interventions focusing on the value of education or the beliefs students hold about their own ability can have marked effects.

3. In the past 10 years, what would you judge as the most significant contributions your field has made?
In the UK virtually nil. Internationally – the development of control-value theory. Getting people to take emotions in learning seriously.

4. What are the priorities in your field of educational research, and what is driving these?
Breaking down the strange hold that sociology/critical theorists/social theory has on education research in the UK (if you want to see evidence for this, look at your own steering group… same old, same old, Joh Gray, Peter Connolly….. education psychology has much to offer. We are light years behind the USA, Australia and Western Europe. The dogmatic biases of those who make funding decisions against psychology is remarkably short sighted.

5. What particular barriers and challenges do you face in undertaking educational research, and what changes might help overcome these? Please say whether these barriers and/or challenges apply to 'blue skies' or 'applied' research.
Getting funded. In the UK…. For psychology, educational psychology is too education. For educationalists it's too psychological.

6. What opportunities (including opportunities for dissemination) exist to deepen the contribution that your research field makes to policy, teaching and learning, and society?
Very few – getting the message out is difficult unless you're one of the chosen few.

7. How do you disseminate your research?
Journals, online blogs, newspapers, anyone who will listen.

8. Are there demonstrations of effective links between educational researchers, policy-makers and practitioners in this country, or internationally, that the Working Group should be aware of?
Not that I am aware of.

Mark Quinn

Questions for teachers, school and college leaders and teacher trainers

1. How are you involved with teaching in schools and colleges?
   This is my 22nd year of teaching History and Politics in English secondary schools. I have been a head of sixth form, and I have now been an assistant head teacher for over 8 years. My role is staff development, with responsibility for initial teacher training, NQT induction, leadership development and improving teaching and learning. I lead the team of lead practitioners and 'research coordinators'.

   For 2 years I have worked on a day-a-week basis for the London Centre for Leadership and Learning, at UCL IOE. I develop and facilitate courses on leadership of professional development, performance management, school improvement, etc.

2. Have you been involved in academic educational research?
   For 6 years I have tutored colleagues for their Masters in Education, through Middlesex University. We take a practitioner research approach. I guide them on issues of research methodology, ethics and validity. I gained my own MA through this route. I have conducted a small number of personal action research projects, and I blog on that interest.

   I am a member of and contributor to the IOE R&D Network, through which I participated in their Leading Evidence Informed Practice in Schools programme.

   At my school, I created the roles of Research Coordinator: they champion research engagement and also help locate and popularise educational research findings within the school. I line manage their work.

3. How have educational research findings informed your work, and how has your usage of educational research findings changed over the past 10 years?
   I have attended the ResearchED conferences since 2012; these, and Twitter, have helped me mature my interest in research engagement. Tutoring the MA candidates has broadened my own understanding, as they explore a variety of fields.

   Educational research has informed my advice to colleagues across a number of areas of pedagogy and school leadership. In particular, how we measure impact of interventions and professional development, and how we no longer grade lesson observations has been research-influenced.

4. How easy do you find it to identify, access and make use of educational research, and what are your main sources of educational research findings?
   In one important regard, access to educational research should not be 'easy'. Research should always be understood as conditional, and bite-sized approaches can exclude important nuances. That said, no busy teacher can lounge for long in a library, and few can conduct their own studies beyond those immediately impinging on their own classrooms and roles.

   I make use therefore of the EEF toolkit, the IOE R&D Network and, when I am looking for something more esoteric, I will try Google Scholar.

5. Are there demonstrations of effective links between practitioners, policy-makers and researchers in this country, or internationally, that the Working Group should be aware of?
   There are a number of important such links. ResearchED is a worthwhile endeavour, although I would like it to better promote the small-scale projects going on in schools.

   The LSEF helped generate several excellent academic-school partnerships. Ongoing Lesson Study initiatives are one legacy.

   The IOE R&D Network helps to connect school leaders and teachers to the evidence base, and encourages the growth of research champions.

6. What would be your priorities for educational research,[7] and why?
   I want individual teachers to become more research savvy – to be able to read critically the research and apply it to their own situations wisely. I believe this savviness is best achieved by they themselves learning to conduct small-scale enquiries.

   I want the same for school-leaders. I want them to achieve the same criticality by taking a more rigorous enquiry approach to in-school monitoring and review: 'researching' their own practices so that they can better understand the theory they read elsewhere.

   I want all school practitioners to see research engagement as a fundamental of CPD.

Jim Ryder

I am responding in an individual capacity as Professor of Science Education at the University of Leeds. There are many issues that could be raised in response to this call. Below I provide one targeted proposal that I see as important but in my judgement hasn't been strongly represented in previous debates on the issue. This is contextualised in formal education within school settings reflecting my area of expertise. The proposal relates to the call Q4, Q5 and Q6 for researchers.

PROPOSAL. We need to better understand the process and outcomes of a range of modes of school teachers' engagement with educational research

There have been many initiatives aimed at supporting teachers' engagement with educational research[8]. Significant resources have been spent on such initiatives. However, the process and outcomes of such engagement have rarely been the focus of significant high quality research activity (Cordingley, 2015). Furthermore, effective processes of teacher-research engagement are likely to be varied and context-specific. Thus, we need to understand how these details of context 'play out' as teachers engage with education research within schools. There has been a recent EEF programme in this area[9], but evaluation activities have largely focused directly on final student outcomes, with limited consideration of process or teacher experiences.

There are many ways in which teachers might engage with education research. A basic distinction has been made between teacher engagement *in* research and *with* research (Borg, 2010). Thus, teachers can undertake research activity within their working contexts, often referred to as action research or practitioner research (Cochran-Smith & Lytle, 2009). However teachers can also be seen as 'consumers' of existing educational research knowledge; this is typically the assumption behind activities within the 'what works' frame[1]. Appropriate representations of teacher research engagement recognise how teachers can work with both existing educational research knowledge and local collection of school-based evidence (such as student learning outcomes) over time to develop their practice (Levin, Cooper, Arjomand, & Thompson, 2011; Levin, Qi, Edelstein, & Sohn, 2013). However, there are many distinct ways in which this could be operationalised, For example: within existing professional development programmes (e.g. through national or regional science learning centres); school-based 'lesson study' style professional development perhaps including 'brokers' of education research findings; teachers completing accredited Masters or doctoral level studies with universities, etc.

[7] These could, for instance, be concerned with identifying research questions to be addressed to improve practice, or improving the usage of educational research.
[8] https://educationendowmentfoundation.org.uk/about/what-works-network/
http://ies.ed.gov/ncee/Wwc/
[9] p.21-23, https://v1.educationendowmentfoundation.org.uk/uploads/pdf/EEF_Annual_Report_2013-14.pdf

In short to explore the ways in which 'high quality research has the potential to transform education in the UK'[10] we need to develop and support a research programme involving teachers, school leaders and researchers that explores in detail the process and outcomes (for teachers and students) of a range of research-informed modes of teacher-research engagement.

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[10] RS-BA Call for Views

CMPJ Tillakaratne

The background

In this particular government organization, the research & development branch was initially established in 2009 and I assumed duties in 2010. At the beginning very less amount of financial resources have been allocated and due to the monetary constraints certain activities have not been activated. Over the years financial resources allocated has increased and identified activities implemented in collaboration with mainly the faculties & departments of education at the universities.

1. What are your priorities for educational research funding, how are they determined and what influences any change in these priorities?

   Annual Implementation Plan-2016
   Identified Activities
   1. Provide assistance & guidance to identify issues & research requirements in each subject area including provinces
   2. Co-ordinate/assist all research studies conducted by external agencies/development partners
   3. Publish a bi-annual research journal
   4. Advanced training & development on research
   5. Education Forum ”Role of Education in Transforming Education”

Activities are identified based on the requirements in the system & the availability of the financial resources.

In addition, certain instances priorities for educational research funding are determined by the interests of the head of the organization. For example action research program for teachers & in-service advisors (100 pax in 2013) initiated by one of the previous head straightaway with good intentions. The teachers & in-service advisors, those who have completed successfully awarded a certificate and a small grant. This pave the way for them to identify problems at the grass root level, to make a significant difference and to energize them for their further professional development. Further, certain research projects had designed to see the outcomes of the implemented programs.

Moreover if the head of the organization has research background and understand the value of research outcomes, then willingly allocate financial resources to have more evidence based information.

2. How do you disseminate the educational research you produce or support?
   The dissemination seminars are organized for policy makers as well as for the implementers at school level and the above, in central location. In 2016 planning to conduct two studies in collaboration with the faculties of education.

   - Study on technology stream: with the aim of providing skilled human capital a fifth stream was introduced to the G.C.E. (A/L stream) in 2013. The main objective of the study was to identify the readiness of the schools to implement the technology stream, identify the barriers for the successful implementation of the technology stream and suggest measures to overcome the above barriers.
   - The research method used were survey designed base on the data collected from three questionnaires. The survey was for 251 schools, initially technology stream introduced in 2015. The data was collected through a representative from each school and the results of the study will be disseminated in early November for the principals of particular schools to strengthen and expansion of technical & vocational education at the secondary education level. The report will disseminate to all schools where technology stream has implemented

and to the policy makers. This study has been conducted in collaboration with the faculty of education.

- A study on the achievement levels of the school students, a study which is based on grade three:
  This study is to identify achievement levels to examine the gap between the assessment methods & achievement levels of students in relation to subject competencies and to prepare suitable assessment techniques. The sample consists of 507 schools in island wide. The survey research design will be used to analyse qualitative and quantitative data. This study will be carried out in collaboration with the faculty of education, Open University of SL. The data will be collected through question papers given to the students on mother tongue and math. Further interviews will be conducted by the in-service advisors with teachers, parents and other stakeholders to have a comprehensive analysis. The findings will be disseminated to all schools in the sample and to the policy makers. If the central government take initiative to disseminate the research findings that will create a link between research in education, policy and practice.

- The journal produce by the Research & Development branch every six months goes to schools and to the policy makers.

3. Is it become easier or more difficult, to fund research that aligns with your objectives and what do you think could be responsible?
   Specially in every organizations, it is evident that if the head of the particular organization understand & appreciate informed based decisions it is become more easier to fund research, that align with our objectives.

4. Are there unexploited opportunities for educational research to inform policy?
   There are many unexploited opportunities for educational research to inform policy. The findings of the research conferences annually organized at the central level which could be used policy makers to evaluate the effectiveness of existing policies. The faculties/departments and school of education at the universities, their research findings are untapped to change the existing policies. The lack of coordination between general and higher education institutions further hinder to inform policy makers, the required changes that should take place.

5. Are there demonstrations of effective links between policy-makers, researchers and practitioners in this country, internationally, that the working group should be aware of?
   The Bett Asia Leadership Summit is a platform that effective links build up between policy makers, researches and practitioners. The third annual conference in Malaysia is a cutting edge conference that brings together decision makers, researchers & practitioners from across Asia and beyond. This summit is regional conference tailored for senior education leaders and professionals. The summit events consists of key notes from high level speakers will be followed by three afternoon breakout streams of workshops, demonstrations, discussions and presentations with an exclusive digital exhibition. This will be Asia's leading platform for sharing innovative case studies, inspiring regional projects and trends and themes for the region.
   We plan to organize a research symposium at the central level to inform decision makers about the research findings.

6. What examples can you give of where educational research has had a significant impact on policy?
   The study (with other findings of the mission) that had undertaken to investigate the technology stream has had significant impact on policy. Instead of expansion of number of schools mission had decide for qualitative improvement of the existing schools.

The previous Bett Asia Leadership Summit which was held in Singapore on education research has had significant impact on policy in the region.

Dr Kristy Turner

1. How are you involved with teaching in schools and colleges?
   I have been teaching secondary chemistry for 11 years and am now in a school teacher fellow role where I combine teaching in a secondary school with teaching in Higher Education (we believe I am the only person in the country doing this).

2. Have you been involved in academic educational research?
   Yes. I have published academic papers in chemistry education research. (Journal of Chemical Education http://pubs.acs.org/doi/abs/10.1021/acs.jchemed.5b00981 and Chemistry Education Research and Practice in press). My paper in J. Chem. Educ. published work done in a secondary school setting. I also peer review for both journals, primarily papers discussing the teaching of fundamental chemistry concepts like bonding to secondary and lower undergraduate year groups but also papers on laboratory chemistry and accessibility.

3. How have educational research findings informed your work, and how has your usage of educational research findings changed over the past 10 years?
   Educational research has changed how I teach particular concepts and also the way some of my teaching is delivered. Work on misconceptions in bonding (Taber et al) has prompted me to be more careful with language I use in the classroom and to open up dialogue about the how the complexity of models increases as students progress through school. It has made me conscious not to use shortcuts to exam success for students where deeper understanding would be more beneficial (for example, the octet rule that atoms when bonding get full outer shells due to stability is useful for lower achievers but for students who are going to study chemistry beyond GCSE it is a limitation to understanding so in higher achieving groups I am careful to make sure I stress that it is not the whole picture).

   Reporting on the ideas around flipped learning in chemistry teaching (various conference presentations by Michael Seery, University of Edinburgh and review) has led me to incorporate an eLearning led flipped learning approach in my teaching.

   My usage of educational research has increased in the last 10 years as I have become more confident as a teacher and felt able to embrace ideas beyond those given during teacher training. I work in a school that is supportive of new initiatives and educational research and I am trusted to innovate in my teaching without fear of reprisals for poor results. The availability of snippets of educational research through the medium of social media (mainly Twitter) has meant I am seeing much more educational research than I used to and am able to follow that up in my own time. In the past I had to actively go looking for educational research.

4. How easy do you find it to identify, access and make use of educational research, and what are your main sources of educational research findings?
   I find this quite easy as I work in a university and a school so have access via my university library. Although I regularly review the literature as part of my research role I also benefit greatly from dissemination of educational research in mainstream publications. For me in chemistry this is mainly through publications from the RSC e.g., Education in Chemistry and ASE e.g., Science in School, School Science Review as well as through their social media channels and the EiC blog. Making use of educational research from primary literature can be a challenge as it is often

written in a style that is difficult for practitioners to access and contains few concrete examples of implementation in environments akin to those most practitioners are working in.

5. Are there demonstrations of effective links between practitioners, policy-makers and researchers in this country, or internationally, that the Working Group should be aware of?
   My own role is an example of this. I am an educational researcher (albeit one with a primary focus in chemistry) and also a practitioner and I speak at a number of conferences each year. I work closely with my professional association (the RSC).

6. What would be your priorities for educational research,[11] and why?
   Development of depth of conceptual thinking in young people (as opposed to memorisation) and the design of assessment items (in reality mainly examination questions) to support that.
   This is important because the assessment culture currently is encouraging students to engage more with assessment items (e.g., past papers) than with the subject content, undermining efforts to deepen understanding.

   Developing a learning culture in school environments where learning is encouraged for the sake of learning rather than because it leads to a tangible reward (e.g., an examination grade, entry to a particular university course).

   I believe we have rather lost the purpose of education and teachers feel more deliverers of a curriculum than teachers of the subject they are passionate about. Students are very focused on outcomes and rewards which makes them less likely to work when that reward is far in the future or absent entirely.

[11] These could, for instance, be concerned with identifying research questions to be addressed to improve practice, or improving the usage of educational research.

Anna Wood

Physics Education Research, Researcher

1. Describe the contribution your field has made to educational research, policy, teaching and learning, and society?

   See below.

2. In the past 10 years, what would you judge as the most significant contributions your field has made?
   - Demonstration that 'active learning' is better than 'traditional', passive lectures for conceptual understanding + use of evidence based teaching methodologies
   - Work on understanding the difficulties that students have in learning physics e.g. on 'misconceptions'
   - Work on differences between novice and expert thinking
   - Development of concept inventories (e.g. Force Concept Inventory - FCI, now adapted for other disciplines)
   - Development of 'Peer Instruction' and similar pedagogies (Just in time teaching, modelling based instruction, think pair share etc.)

3. What are the priorities in your field of educational research, and what is driving these?
   - Understanding how students learn physics/how to help them overcome the difficulties they have
   - Improving teaching methods – driven by desire of teachers for good understanding

4. What particular barriers and challenges do you face in undertaking educational research, and what changes might help overcome these? Please say whether these barriers and/or challenges apply to 'blue skies' or 'applied' research.
   - Main issue is a lack of funding stream (as identified by the Institute of Physics)
   - Lack of time for research (as PER folk are also lecturers/researchers in their own field – hence need for funding stream to employ dedicated researchers)
   - Lack of recognition of PER as a branch of science, as it is in US (resulting in my fellowship application to the Royal Society being rejected as outside their remit – despite RS offering education fellowships in the past)
   - Further issue is lack of expertise – many PER researchers have science background and need training in social science methodologies.

5. What opportunities (including opportunities for dissemination) exist to deepen the contribution that your research field makes to policy, teaching and learning, and society?
   - Journals such as New Directions
   - Conferences such as Physics Higher Education Conference/HEA STEM conference

6. How do you disseminate your research?
   - As above, plus international journals including International Journal of Science Education, and Physical Review PER
   - Seminars in Department of Education
   - Workshops at conferences

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Call for views: organisations' responses

The responses in this document are reproduced verbatim. Please note that not all respondents answered every section of the Call for Views, or all questions within each section. The original complete survey is provided in the Appendix.

Contents

The Association for Science Education

The **Association for Science Education (ASE)** is the largest subject association in the UK. Members include teachers, technicians and others involved in science education. The Association plays a significant role in promoting excellence in teaching and learning of science in schools and colleges. Working closely with the science professional bodies, industry and business, ASE provides a UK-wide network bringing together individuals and organisations to share ideas and tackle challenges in science teaching, develop resources and foster high quality continuing professional development. The Association for Science Education can trace its origins back to 1900. Incorporated by Royal Charter in October 2004, the ASE operates as a Registered Charity.

The Association welcomes the opportunity to respond to the Royal Society and British Academy call for views on educational research. This response has been formulated in consultation with ASE's national Research Group and ASE Futures (teacher educators). Together these groups bring expertise in primary and secondary science education, from a range of viewpoints, including classroom practitioners, educational researchers, teacher education tutors and professional development providers. Our response focuses on the questions for researchers and subject associations.

Summary of main points

The Association is a unique group which brings together teachers, educational researchers, teacher trainers, professional development providers, technicians and others and so offers the opportunity for an exchange of ideas and genuine debate about research into practice.

The Association's Research Group helps teachers and other members to realise the potential and scope of different forms and approaches to research. As a result that they can begin to understand, and develop their ideas in practice, that research can provide insights, interpretations and answers about current interests in educational practice.

Questions for researchers

1. What broad area of educational research do you work in, and what is your role?
   ASE's Research Group members work in a range of university and other settings, covering research in science education, effective pedagogy, learning, curriculum development and assessment.

2. Describe the contribution your field has made to educational research, policy, teaching and learning, and society?
   The Association has a long standing reputation for undertaking educational research and influencing policy. Recent policy examples include ASE's leading role in shaping the current national curriculum programme of study in England for primary science with its strong focus on the integration of 'working scientifically', and the assessment of primary science through an influential Nuffield Foundation publication from a working group led by a past ASE President, Professor Wynne Harlen[1]. At secondary level, a current policy into practice example is the Nuffield Foundation supported Language of Mathematics in Science publications which provide guidance on effectively addressing the issues of effective teaching and learning of mathematics in science classrooms[2]. For other examples of ASE projects that have been influential on informing practice, see our response to question 3.

[1] Developing policy, principles and practice in primary school assessment http://www.nuffieldfoundation.org/sites/default/files/files/Developing_policy_principles_and_practice_in_primary_school_science_assessment_Nuffield_Foundation_v_FINAL.pdf

[2] The Language of Mathematics in Science: A Guide for Teachers of 11-16 Science and The Language of Mathematics in Science: Teaching Approaches http://www.ase.org.uk/resources/maths-in-science/

We have many members who have made a significant contribution to their specific research fields through their publications and advocacy. For example:
Professor Paul Black - Science Education and Assessment
Professor Jonathon Osborne – Argumentation
Professor Judith Bennett – Curriculum Approaches
Professor Keith Tabor – Nature of Science
Professor Shirley Simon – Teacher Professional Learning & Argumentation
Professor Robin Millar – Physics Education, practical work & Assessment
Professor Michael Reiss – Science education & Bioethics
Professor Justin Dillon – Informal Learning and Fieldwork
Professor Wynne Harlen – Primary Science & Assessment

The Association provides a wide range of opportunities for these researchers and others enable teachers to be informed of and engaged in educational research. These opportunities include ASE's annual conference and several regional conferences, regular meetings in each of its 18 regions, five journals[3], publications and teaching resources.

The Research Group has published a specialist book entitled 'Research in Science Education, which was edited by a former Chair of the group. Many members of the group have contributed chapters, and a new edition is under development for publication in late 2017-early 2018. A feature of ASE publications (and project outputs in general) is that less experienced writers are supported by leading writers and editors in their fields, in doing so identifying and encouraging the next generation of science education leaders.

3. In the past 10 years, what would you judge as the most significant contributions your field has made?

The Targeted Initiative on Science and Maths Education (TISME) [4] was a programme of five research projects, funded by the Economic and Social Research Council in partnership with the Institute of Physics, the Gatsby Foundation and the Association for Science Education. The overall aim of TISME was to uncover new ways to encourage greater participation, engagement, achievement and understanding of science and mathematics among young people. Between them, TISME's projects covered extensive ground in mapping how young people engage with science and mathematics education, their aspirations for the future, the effects of recent changes to the curriculum and its teaching, and how students' understanding of the subjects might be improved.

The Improving Practical Work in Science (Getting Practical) programme of professional development. A report from SCORE (authored by ASE) [5] requested by the Department for Children, Schools and Families (DCSF) formed a basis for the DCFS tender on Improving Practical Work in Science, which was won by a consortium led by ASE (with core partners CLEAPSS, Centre for Science Education Sheffield Hallam University and Science Learning Centres, and with support from a large range of other organisations). The programme was underpinned by a past ASE President, Professor Robin Millar's work on practical science[6]. One of the outputs from the Getting Practical programme was a framework for practical science in schools[7]. Other outputs included a CPD toolkit which was made freely available at the end of the programme (and previously had been available only to the trainers involved in providing the Getting Practical CPD programme). The programme was independently evaluated by the Institute of Education[8]. This report was available on the ASE website and articles by the authors from this report were published in ASE's peer reviewed journal –

[3] http://www.ase.org.uk/journals/
[4] http://www.kcl.ac.uk/sspp/departments/education/research/Research-Centres/cppr/Research/pastproj/TISME/Index.aspx
[5] https://www.stem.org.uk/elibrary/resource/33088
[6] https://secure.ase.org.uk/membersarea/shop/details.asp?Id=52&Red=True
[7] https://www.stem.org.uk/system/files/elibrary-resources/legacy_files_migrated/27107-getting%20practical.pdf
[8] https://www.ase.org.uk/documents/getting-practical-report/

School Science Review (SSR). Some of these articles are available to ASE members only[9].

One of the most authoritative research programmes that has influenced policy and practice in schools has been the work on Assessment for Learning, initiated by the review by Paul Black and Dylan Wiliam in 1998[10]. This work has and continues to influence the teaching and learning of science in schools led by Chris Harrison (past Chair of ASE) through a range of collaborative action research projects and more recently an international MOOC.

4. What are the priorities in your field of educational research, and what is driving these?
   A recognition of the importance and relevance of Action Research and Practitioners Research to teachers' professional development and progress in developing their practice in classroom situations (of pedagogy, understanding learning, modes (and methods) of assessment).

   Inquiry learning – the UK research in science education community has acted as partners in several EU FP7 funded projects in recent years (INQUIRE<SAILS< ASSISTME< MASCIL) and the findings and resources built up through these projects need to be disseminated more broadly within the STEM community.

5. What particular barriers and challenges do you face in undertaking educational research, and what changes might help overcome these? Please say whether these barriers and/or challenges apply to 'blue skies' or 'applied' research.
   Seed-corn financial support to enable early ideas for educational research projects (both 'blue skies' and 'applied') to be tested before engaging partner organisations (where appropriate) and seeking larger scale funding.

   Challenges when involving personnel in schools in educational research:
   - Time (and supply cover funding) for teachers to be involved in re-developing their practice and/or gathering evidence of impact of any changes implemented.
   - Ethical issues involving children/students in studies of classroom happenings, events or projects.
   - Research assistance, that is of a good quality, to generate research tools; carryout evidence gathering and process data (in various analytical ways).

6. What opportunities (including opportunities for dissemination) exist to deepen the contribution that your research field makes to policy, teaching and learning, and society?
   In addition to the Association's own wide ranging dissemination opportunities which include ASE's annual conference and several regional conferences, regular meetings in each of its 18 regions, five journals (particularly the peer-reviewed Journal of Emergent Science, Science Teacher Education and School Science Review), publications and teaching resources, ASE is represented on a number of national groups focusing on policy research and policy into practice.

7. How do you disseminate your research?
   ASE's Research Group members disseminate their work through the European Science Education Research Association, International Council of Associations for Science Education, Commonwealth Association for Science, Technology and Mathematics Educators and the British Council, amongst others.

   Within the UK, dissemination is through British Educational Research Association and ResearchED, amongst others. Additionally, ASE's Research Group members use the wide ranging dissemination platforms of ASE to promote their work (see response to question 6).

[9] http://www.ase.org.uk/journals/school-science-review/search/?keyword=abrahams&month=0&year=0&submit.x=34&submit.y=8
[10] http://www.tandfonline.com/doi/abs/10.1080/0969595980050102

Association staff and members are regularly represented on national committees beyond ASE, act as governors and mentors in schools, using these opportunities to disseminate their research work, and engage teachers to interact with it, as appropriate.

8. Are there demonstrations of effective links between educational researchers, policy-makers and practitioners in this country, or internationally, that the Working Group should be aware of?
   The various EU projects, such as Creative Little Scientists, Engage, SAILS, ASSISTME and MASCIL all demonstrate effective links between educational researchers, policy makers and practitioners.

   See also our response to question 3.

Questions for subject associations

1. How do educational research findings inform your work?
   Through generation of various publications that researchers, practitioners and educational leaders work on collaboratively (as suggested earlier). These publications address curricular, teaching, learning and assessment issues, usually from the perspective of the practitioner, but increasingly we inform policy makers too.

   A Research Group that is comprised of teacher educators, teachers and researchers working in a range of geographic locations and settings across the country, as well as within HEIs and school partnerships of different kinds.

2. How easy do you find it to identify, access and make use of educational research, and what are your main sources of educational research findings?
   Through Research Group activities, comprised of university educators, researchers and teachers there are discussions that relate research to practice and vice versa.

   Much of what has already been stated in the earlier section, ‘Questions for Researchers’.

3. What would be your priorities for educational research, and why?
   More in-depth studies (and longitudinal work) that examine ‘why’ particular large scale (or indeed smaller scale studies) do (or do not) produce quantifiable and statistically significant outcomes. There is an increasing trend, currently, for Randomised Control Trials (RCTs). The outcomes of these kinds of studies indicate how ‘far’ or how much of an impact an intervention has had. The Education Endowment Foundation (EEF) with the Sutton Trust have produced Teaching and Learning Toolkits that indicate the extent of impact from the ‘effect sizes’ (and evidence) that the findings from these studies have claimed to show. The toolkit covers 30 topics, including aspects of learning such as ‘Collaborative learning’, ‘Digital Technology’, ‘Peer Tutoring’ or ‘Small Group Tuition’. It would be helpful for teachers to know what the key elements of the interventions (i.e.; in the classroom setting what ‘must’ they do and what should they ‘not’ do!) should be paid attention to, to produce the significant effect sizes.

   Examining why some studies produce contradictory evidence, e.g. two significant studies have shown both positive and negative outcomes of the impact of Teaching Assistants. This indicates there needs to be clarity or further investigations into the methodologies of (large scale) research studies. At first glance, of course, Teaching Assistants can be employed in a wide variety of ways, so the extent of their effectiveness in different schools will vary significantly.

   Another example is Cognitive Acceleration through Science Education (CASE) and the EEF-funded Let’s Think project for secondary schools. The most recent evidence this autumn indicates there is not a significant effect size, yet in the 1980, 1990s and even into noughties there were well received

studies that showed a statistically significant benefit for students 5 years later (after the Thinking Science intervention). There is a need for research that provides more detailed and nuanced accounts of the methodologies used and applied, particularly in large scale RCT projects so that when studies focusing on the same or similar issues show significant (or not significant evidence) there is an open opportunity for reflective discussion about the nature of the research carried out. RCTs can be very expensive and labour intensive to carry out; perhaps there is a need for more public (educational research community) scrutiny of the approach of these trials. There certainly needs to be thorough evaluative studies looking at the ways these trials are conducted to explore what lessons there are for teachers, educational researchers and funders of this type of research.

We also recommend studies that look at the ways that Hattie's meta-analyses work (illustrated in *Visible Learning*)[11] is taken up by schools; how and why the various factors work for teachers and schools in differing circumstances, in both the short and longer term.

4. Are there demonstrations of effective links between practitioners, policy-makers and researchers in this country, or internationally, that the Working Group should be aware of?
   See our response to question 8 (Questions for researchers). Other examples where ASE's Research Group members have been involved include Leadership for Learning in Oxford which has provided influence at a local level to change policy and practice, but not yet nationally. There is scope for the principles from projects such as this to be applied more widely.

[11] http://visible-learning.org/2009/02/visible-learning-meta-study/

Association for Information Technology in Teacher Education

Summary of main points

This response is made on behalf of the Association for Information Technology in Teacher Education.

The Association for Information Technology in Teacher Education (ITTE - www.itte.org.uk) is a professional subject association which focuses on supporting and representing the views of those involved in training pre-service and in-service teachers. It has a specific focus on improving learning through the application of digital technology in teaching and through the effective teaching of Computing as a subject. Our concerns include: the pedagogical application of digital technology by all teachers; developing the teaching of computing and digital capability; and the effective use of digital technology in teacher education itself. We are an independent organisation with a membership drawn from Higher Education institutions, schools, colleges, SCITTs and supporting organisations.

- Educational research is central to the work of subject associations such as ITTE. Subject associations use, disseminate and apply research in a multitude of ways, including research journals, conferences and books.
- The work of subject association members forms the knowledge base for teacher education and the teaching profession. As the landscape of teacher education is changing policy based on research becomes more essential.
- ITTE is supporting the translation of educational research into practice through a number of initiatives including our knowledge mobilisation strategy, International Teacher Education Knowledge Mobilisation Summit (report to be published at www.itte.org.uk) and MESH guides. These widen access to educational research and provide resources to support teachers.
- ITTE has a long track record of informing policy and practice, however, this has become more challenging in recent years due to changing Government priorities.

Questions for subject associations

1. How do educational research findings inform your work?
   Research is central to the work of ITTE and is carried out, disseminated and applied in a number of ways:
   a) The ITTE research journal 'Technology, Pedagogy and Education' (http://www.tandfonline.com/toc/rtpe20/current) is an international, peer-reviewed journal that seeks to serve the international education community by disseminating research findings regarding the use of information and communication technology (ICT) to improve teaching and learning. It explores the particular contribution that ICT can make to educational environments, focusing on empirical evidence derived from both quantitative and qualitative research designs, and on a critical analysis of the ways in which new technologies can support learning and teacher professional development in all phases of education.
   The journal aims to promote the advance of research and scholarship in its field; to provide a vehicle for the exchange and dissemination of reports regarding implementations and practices and research; to offer a forum for the debate of contemporary issues; to create an international arena for discussion of the role of ICT in education and professional development; and to develop greater awareness, understanding and cooperation between educators.
   b) ITTE organises regular conferences and research workshops as forums to share and discuss the research of members (see details of recent conferences on www.itte.org.uk).
   c) Members also publish their research nationally and internationally through journals and conferences, for example, see the list of articles on: http://itte.org.uk/wp/articles-and-papers/. Much of this research is cutting edge with important findings for the teaching profession.

d) ITTE's research is also published in books and mobilised into textbooks for novice and experienced teachers, for example, see the list of member's books at: http://itte.org.uk/wp/books-etc/.
This research and the textbooks derived from it form the knowledge base that underpins the use of technology in the teaching profession. Members are authors of the main books used for teacher training in our subject area but also more generally. Here is an example of how one editor uses research:

> "As an editor of the major textbook series for secondary teacher training in the UK I look for every aspect of the work to be underpinned by educational research. However, there are huge gaps in the research base as revealed by the extensive review and development work undertaken by myself and colleagues across the Subject Associations and funded by the Training and Development Agency for schools. £20m was spent on remedying this and creating a world leading resource bank to underpin teacher training. All this was archived on the National Archives by the coalition government."

e) ITTE members are teacher educators whose own teacher education programmes are informed by educational research including that of members of the association and the wider educational research community
f) ITTE, along with international colleagues, universities and professional associations, has set up the Education Futures Collaboration charity (http://www.edfuturescollaboration.org). The Education Futures Collaboration aims to professionalise teaching through the creation of a sustainable model for Knowledge Management and collaboration using web 2.0 tools. It provides an e-infrastructure to support education as it transforms into a 'knowledge industry' and supports knowledge transfer, collaborative knowledge building and sharing within education sectors in individual countries as well as worldwide.
g) For 2015-17, as part of the ITTE Knowledge Mobilisation Strategy, ITTE awarded four funded research fellowships for members undertaking and publishing systematic reviews, with teachers, of the evidence for practice in the field. These cover technology enhanced learning in early years, the use of social media in teacher education, online communities in teacher education and learning through personal devices. See http://itte.org.uk/wp/2016/01/itte-kms-first-round-awards/.
h) ITTE is a partner organisation of MirandaNet, an international community of over 1000 professional educators in 80 countries which has developed a unique approach to teacher professional development through active, practice-based research. This research is published at http://mirandanet.ac.uk/ and attracts 72,000 readers each year.

2. How easy do you find it to identify, access and make use of educational research, and what are your main sources of educational research findings?
As the majority of ITTE members are university academics, we are uniquely placed to access the educational research that is behind publisher paywalls and have access to the support and training required to find and evaluate quality research evidence. However, many of the teachers that we work with cannot access this material and more needs to be done to enable teachers to access educational research. Nationally and internationally, access to research is too varied and inconsistent. In May 2016, ITTE organised an International Teacher Education Knowledge Mobilisation Summit. The full report will shortly be published on the ITTE website and provides extensive detail on this topic: Leask, M. and Younie, S. *et al*. (2016) *Making a difference to teacher quality: teachers and teacher educators as change agents: Full Report on the first International Teacher Education Knowledge Mobilisation Summit 2016.* Education Futures Collaboration.

ITTE is involved with initiatives to widen access to educational research:

a) The ITTE journal, Technology, Pedagogy and Education has a Green Open Access policy and allows for the publication of the Author's Accepted Manuscript on personal websites and

(after an embargo period) on institutional and subject repositories. It also allows the immediate publication of open access articles for a publishing fee (Gold Open Access).

b) MESH Guides (http://www.meshguides.org) are updatable research and evidence summaries or digests developed by teachers and researchers working together to support teachers' access to research. MESH Guides provide teachers and other educators with quick access to summaries of research-based specialist knowledge to support their professional judgement.

3. What would be your priorities for educational research, and why?
Members of ITTE have a number of different research priorities however, some key priorities would be:
    - Pedagogic research – teaching and learning for all learners across all curriculum subjects. This is essential to provide evidence-based innovative pedagogy to support the use of new technologies in classrooms.
    - Translational research – how best to translate educational research into teaching practices.
    - Practitioner based research – supporting and empowering classroom teachers to research their own practice.

4. Are there demonstrations of effective links between practitioners, policy-makers and researchers in this country, or internationally, that the Working Group should be aware of?
ITTE was formed in 1986 and has a long history of informing policy and practice. Members have worked with a range of national and international organisations and bodies including BECTA, the NCTL and Department for Education to inform, develop and maintain the quality of ICT provision in teacher education and hence the quality of teaching in schools. This was documented in some detail in the 'Voices' project: Hammond, M. (2009) *What does our past involvement with computers in education tell us? A view from the research community*. Available online: http://itte.org.uk/wp/voices-project/.

    Some examples of how ITTE has been able to contribute to policy include:
    - Close relationships between the Chairs of ITTE and named individuals at the TDA or NCTL with responsibility for technology practice.
    - Representation on the Primary and Secondary National Curriculum for Computing in ITT Expert Group.
    - Representation on the writing group for the 2014 ICT/ Computing National Curriculum.
    - ITTE was a key contributor to the 2008 TTA "Characteristics for the provision and use of ICT that all teacher training providers should be aiming to attain" http://itte.org.uk/wp/wp-content/uploads/2016/04/ictcharcteristicsforproviders.pdf.
    - Funds were made available to subject associations to support research and the induction of new teacher educators in a research culture (the ITT New Tutors project).
    - ITTE was also involved in the evaluation of policy activities, for example the evaluation of the BBC News School Report - a collaboration between TDA and BBC.

    However, the closure of BECTA (British Educational Communications and Technology Agency) had a severe impact on our research community. More recently, without a named individual at the DfE responsible for liaison with subject associations or responsible for developing the use of technology, opportunities to contribute to policy have been reduced.

ATL

Introduction

ATL, the education union, is an independent, registered trade union and professional association, representing approximately 160,000 teachers, head teachers, lecturers and support staff in maintained and independent nurseries, schools, sixth form, tertiary and further education colleges in the United Kingdom. AMiE is the trade union and professional association for leaders and managers in colleges and schools, and is a distinct section of ATL. We recognise the link between education policy and members' conditions of service.

ATL exists to help members, as their careers develop, through first rate research, advice, information and legal advice. Our evidence-based policy making enables us to campaign and negotiate locally and nationally.

In March 2013 ATL held a private seminar, 'Using the evidence base in education policy and practice'. It was attended by politicians, policymakers, administrators, and education researchers. ATL took this step because it was aware of developments in policy in this area, and sought a range of opinion about the way forward. We are grateful to those who attended for their contributions. This paper is informed by the seminar, but does not necessarily represent the views of participants.

Some background

In 1999 the government published the White Paper, Modernising Government. Amongst its wide-ranging proposals for policy creation and implementation was the following commitment:

> We will improve our use of evidence and research so that we understand better the problems we are trying to address. We must make more use of pilot schemes to encourage innovations and test whether they work. We will ensure that all policies and programmes are clearly specified and evaluated, and the lessons of success and failure are communicated and acted upon.[12]

The then Secretary of State for Education and Employment, David Blunkett, had already addressed evidence based policy making by commissioning a report from the Institute of Employment Studies.[13] The 1998 Hillage Report aimed to 'undertake an analysis of the direction, organisation, funding, quality and impact of educational research, primarily in the schools field; and then to produce recommendations for the development and pursuit of excellence in research relating to schools.'

The recommendations concerned strategic coherence and partnership, improving quality, mediation between research, policy and practice, and commitment to evidence-based policy development. A National Education Research Forum was recommended to be established.

In 2000, Blunkett made a speech to the Economic and Social Research Council with the slightly provocative title, *Influence or irrelevance: can social science improve government?* He said:

> '…we will be guided not by dogma but by an open-minded approach to understanding what works and why. This is central to our agenda for modernising government: using information and knowledge much more effectively and creatively at the heart of policymaking and policy delivery.'[14]

This approach marked the remaining decade of the Labour government across policy areas including education. One feature was the increase in the number of large scale evaluations of policies as implemented, such as the national strategies[15]. In this case, the completion of the evaluation followed the ending of the programme but provided justification both for its introduction and its end, as well as lessons

[12] Cabinet Office 1999 *Modernising Government* Cmd 4310, London TSO, par 2.6
[13] Hillage J, Pearson R, Anderson A, Tamkin P 1998 *Excellence in Research on Schools* Research Report No RR74 Department for Education and Employment
[14] Blunkett, D 2000 *Influence or irrelevance: can social science improve government?* Speech to ESRC 2 February, at www.bera.ac.uk/beradev2002/root/archive/ri/no71/index.html
[15] Earle L. et al 2003 *Watching and Learning 3: OISE/UT evaluation of England's national literacy and numeracy strategies, 3rd and final report* Ontario Institute for Studies in Education, University of Toronto

for future interventions on pedagogy. In the case of SureStart, early evaluation provided the basis for policy changes.

The concerns raised by the Hillage report continued to be the central issues in this area. In 2008, the UK Strategic Forum for Research in Education (SFRE) initiated an investigation 'focused on the way educational research is generated and made available for application, as well as on its actual use.'[16] Unlike much work on evidence based policy making, the SFRE was concerned at least as much with professional practitioners as with policymakers. It developed a model of knowledge development originating in the OECD which identifies a six element process:

- Origination and planning
- Creation and production
- Assessment and validation
- Collection and interpretation
- Mediation and brokerage
- Use and impact

A further development over the same period was the introduction by OECD in 1997 of PISA (Programme for International Student Assessment) which 'aims to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old students.'[17] It claims it 'provides governments with a powerful tool to shape their policy making.' OECD countries reportedly asked for such a tool.

PISA claims to have overcome longstanding methodological problems in making international comparisons of student achievement, and indeed over the last decade has established substantial credibility, with OECD member governments at least. Some elements within the academic community remain sceptical about some methodological issues, but has become commonplace for politicians to cherry pick PISA findings, often to provide justification for policy developments. PISA itself makes little effort to counter the 'what works' approach of politicians. This paper attempts to show that in the field of education (and elsewhere) a 'what works' approach to evidence risks oversimplification of complex social phenomena to the point where inappropriate policy interventions may result.

The literature on evidence based policy making describes a number of models. One increasingly favoured by the previous government was the expert review; Leitch, Gershon, Tomlinson, are examples of well-known names. For government, the virtue of the expert review is that it can claim independence while having largely predetermined the outcome by way of the selection of the expert[18]. To put it another way, the expert is the agent of the process of weighing up disparate and perhaps disparate pieces of evidence, synthesising them into a more or less precise set of conclusions.

The effect of the expert review model is to reinforce the dominant concept within governments' use of evidence, which is technocratic: what works? This is a continuation of the approach to natural science in technology policy in the fifties and sixties. Policymaking was simple: the scientist provided the facts which pointed clearly to a single policy solution. Commentators from Lasswell[19] onwards have criticised the simplistic nature of the technocratic approach; it may be doubtful that a nuclear scientist could provide the only answer to the question as to whether Britain should have a nuclear power programme; it is certain that no single expert can do the same for a social policy.

[16] Pollard, A. and Oancea, A. 2010 *Unlocking Learning? Towards Evidence-informed Policy and Practice in Education. Report of the UK Strategic Forum for Research in Education, 2008-2010.* SFRE: London p6
[17] http://www.oecd.org/pisa/aboutpisa/
[18] Not fool-proof: Tomlinson famously laboured to produce a consensus on education qualification reform, only for Downing Street to suffer last minute cold feet.
[19] Lasswell HD 1951 *The Policy Orientation* in Lerner D and Lasswell HD (eds) The Policy Sciences Stanford University Press Palo Alto

Another model of evidence based policy making (which has been described as the enlightenment model) occurs when the experts stand apart from policymakers, their role being to provide the evidence, explicitly leaving it to others to make the decisions. This is better described as evidence informed policy making. While there is a clear distinction between 'based' and 'informed', it is not always honoured in political discourse; indeed, the terms are frequently used interchangeably.

Commentators have noted an implication of the term 'evidence based', which is that it suggests a single correct answer to a policy question which the state determines and imposes externally. The term 'evidence informed', on the other hand, implies that the evidence does not self-evidently lead to a particular decision, that the decision by the state is a judgement, and that as such it is open to question externally.

Many policy decisions are made by parliament. Whilst it is to be hoped that most contributions to parliamentary debate are informed by evidence, it is to be expected that personal values and experience and political expediency of various kinds overlay the evidence. As a former Deputy Chief Social Researcher described it, influences on policy include experience, expertise and judgement of officials and ministers, values and ideology, available resources, habits and tradition, lobbyists, pressure groups and the media, and the pragmatics and contingencies of everyday political life.[20]

In policy areas related to natural science it may be easy to fall into the positivist trap of technocracy. In education, there is no excuse. Politicians are aware that education is not a simple technocratic concern. The very purposes of education are contested; indeed, they are the subject of an eternal philosophical debate. Even in recent years, when neo-liberal positions have become hegemonic, the neo-liberal version of education as the provider of an appropriately skilled, certificated and orientated workforce has remained under challenge. When there are competing versions of 'what for?', 'what works?' is a relatively redundant question.

Education is one of the most value-laden areas of public policy. Not only politicians, but also policymakers, practitioners, and indeed researchers, bring values to their enterprise and reflexively balance them against their practice. A constant undercurrent of opinion, particularly but not only within the teaching profession, is that 'education should be taken out of politics'. In this scenario, it would be possible to imagine policy being based on evidence, but the scenario is certainly impossible and probably undesirable. Not only does the state education service consume a substantial proportion of public spending, but also the purposes and structures of a state education service will always be a matter of public controversy. A more appropriate form of that plea is that politics should not intervene in matters relating to the specific expertise of professionals.

In the next section the implications of this for education research are explored.

Practitioners in education are working with people in all their varieties. Like many other public servants, they are not doing things to people, or even for people, but with people. Policymakers and researchers who wish to develop practice must engage with that constraint on practitioners.

Issues in education research

Theory and method

Before turning to questions of the uses of education research, it is necessary to consider its nature and complexity. A number of academic disciplines contribute to education research, including economics, psychology and sociology.

[20] Davies P 2004 *Is Evidence-Based Government Possible?* Jerry Lee Lecture 2004, 4th Annual Campbell Collaboration Colloquium Washington D.C. p4-6

Following Kuhn, natural scientists generally share an agreed theoretical structure, or paradigm, until sufficient falsification evidence leads to a shift to a competing paradigm. Natural science researchers may well take as given their fundamental theoretical perspective as it is widely held. They may uphold positivism, the view that objects and materials have inherent characteristics which can be measured independently of the observer, thus being capable of numerical description and analysis. Social sciences, on the other hand, have not established 'normal science', a single agreed paradigm. Researchers hold a variety of ideological and theoretical assumptions, and these perspectives inform their preferences with regard to research methodology.

Sociological theories can be perceived as a debate on Marx's dictum in 'The 18th Brumaire of Louis Bonaparte': 'Men make their own history, but they do not make it as they please, they do not make it on their self-selected circumstances, but on their circumstances existing already, given and transmitted from the past.' That is to say, human beings have agency, but an agency constrained by historically formed social structures. Some sociologists emphasise agency, adopting a perspective which recognises the social construction of reality; others emphasise constraint, with a perspective recognising social structures.

Such emphases are related to tendencies amongst researchers to rely on different methodological approaches. The interactionists, phenomenologists, and others look to discover how actors give meaning to social situations, and to do this requires small scale observational techniques such as ethnography. The structuralists investigate the behavioural outcomes derived from a given social structure, and may use numerical data as proxies.

All social researchers, including education researchers, hold a theoretical perspective. In some research, the underpinning theory may be implicit, but in order to evaluate findings the theory needs to be made explicit. Social constructionists are very conscious of the observer effect; any social interaction being observed is affected by the observation. Structuralists tend towards positivism, treating 'social facts' as having an objective existence capable of measurement. They may consider that numerical data can accurately represent behaviour independently of the observation, and that large datasets do represent social reality.

Large-scale datasets

Until this century, the main sources of longitudinal large scale datasets were the British Cohort Studies which follow samples of people born in 1958, 1970, and 2000, and can thus relate educational experience to future lives. The capacity of British education researchers was substantially enhanced by the introduction in England of the unique pupil number (UPN) in 1999, followed by the national pupil database (NPD) in 2002. On first entry to a maintained school each pupil is allocated a UPN which remains with them throughout their school career. Wales has a similar and compatible system, though Scotland and Northern Ireland do not.

The NPD combines the UPN with School Census data and the results of pupils' end of Key Stage assessments, external examinations and other accredited qualifications, as well as pupil characteristics. This allows longitudinal analysis of individual pupil performance within the entire population. One drawback is the lack of any data on parental socio-economic position, but postcode data enables links to IDACI and ACORN, and links are now possible to the British Cohort Studies and the Longitudinal Study of Young People in England (LSYPE), which sampled 13-14 year olds in 2003 and will provide data on transition from education to work. Further, the Education (Individual Pupil Information) (Prescribed Persons) (England) Regulations 1999 were amended in 2013 to broaden the sharing of data and the DfE has simplified the application process for access.

Randomised controlled trials

In 2012 the Cabinet Office Behavioural Insights team published 'Test, Learn, Adapt'. It opened thus: 'Randomised controlled trials (RCTs) are the best way of determining whether a policy is working… However, RCTs are not routinely used to test the effectiveness of public policy interventions in the UK. We think that they should be.'[21] In 2013 the Secretary of State for Education sponsored Ben Goldacre to launch a pamphlet, 'Building Evidence into Education'[22] which developed the same theme, although its examples were not taken from education. Mary James, President of the British Educational Research Association (BERA), commented, 'His journalistic approach, in both his speech and his accompanying paper, is superficial and shows no real understanding of research in education, and especially the debates that have been around these issues for many, many years.'[23]

These publications promote the experimental method: randomly divide a population into halves, perform an intervention on one half and compare outcomes with the other half, the control group. Simple. Or, not so simple in an educational setting to perform the intervention in such a way that it is the only variable. James points out that a 1963 paper by proponents of the experimental method in education described the significant obstacles to it.

As Goldacre accepts, while an RCT may establish a correlation it cannot establish causation, nor can it predict its replication in different circumstances.

Ethnography

Ethnography as a method originated in anthropology, but was imported into sociology in order to improve understanding of why? questions in social research. The researcher seeks to understand a culture through the close study of the habits and speech and lifestyles of its members, and to learn the meanings attached to social interactions by participants. Researchers have engaged with the problems associated with the observer effect, and particularly with the role of the participant observer. Education researchers frequently use ethnographic methods to understand classroom dynamics. Ethnographers claim that classrooms are complex settings, with thousands of interactions taking place each day. In order to understand why an intervention works it is necessary to map and interpret those interactions.

Systematic review

In 'An introduction to systematic reviews'[24], Gough et al point out that regardless of methodology there is a risk that an individual study may not represent the phenomenon under investigation. Traditional literature reviews may have been haphazard, with the selection of studies not undertaken by an explicit method, but a systematic review is explicit about its theoretical assumptions and methodology.

One issue in education research is the number of studies which are never accessed or used. The first rule of social research is to discover what is already researched, but in education at least this has long been a challenging task. With electronic methods a search for relevant studies for review purposes will return thousands of entries, but when scanned against a precise research question most will be discarded, and others will be discarded due to methodological weaknesses. However, the systematic review method should allow the consideration of studies from a variety of perspectives and a synthesis of work from a variety of traditions.

Discussion

The advent of the NPD and its linkages to other datasets seems to have transformed the capacity of researchers to investigate factors relating to pupil performance. It would be easy to forget the substantial

[21] Haynes L Service O Goldacre B Torgerson D 2012 *Test, Learn, Adapt: Developing Public Policy with Randomised Controlled Trials* Cabinet Office, London p6

[22] Goldacre B 2013 *Building Evidence into Education* DFE accessed at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/193913/Building_evidence_into_education.pdf

[23] James M 2013 *New (or not new) directions in evidence-based practice in education* accessed at: http://www.bera.ac.uk/resources/dfe-review-evidence-education-0

[24] Gough D, Oliver S, Thomas J (2012) *An introduction to systematic reviews* Sage London

doubts about the social reality of the test data which are at the base of this structure. The data describe scores achieved by a cohort of pupils in a test executed in a very large number of settings, each with their particularities, and then a succession of such events. They show the ability of children to deal with those particular test items, but also are affected by a large range of other factors, such as the level of preparation given, the adherence or otherwise to the test rubric, local weather conditions on test day, and so on.

These doubts about data follow from the critique of positivism in social sciences. Researchers who use data uncritically in effect take a positivist position, and should make this explicit. A common criticism of RCTs is that they are not based in theory, but this is more accurately described as an unstated theoretical position.

This should not rule out the use of large scale analysis; a cohort of English pupils numbers over half a million, sufficient to minimise the impact of some of the factors. Rather, it places a responsibility on the researcher to be aware of the caveats. RCTs often share with ethnographic approaches the problem of small scale. An experiment conducted in a single institution (which may be necessary in order to get a strictly matching control group) has problems of reliability in the same way as observational techniques. Such studies need to be replicated in a variety of settings to allow more general conclusions to be drawn.

As mentioned above, datasets may produce correlations between variables, but correlations are not causes. To understand why and how a correlation occurs requires smaller scale methods, observing the interactions and the meanings given to those interactions by the individuals.

Consideration of two major policy concerns for the Westminster government may shed more light on issues of research methodology. First, the issue of the wide range of attainment amongst English pupils has led to so-called ‘closing the gap’ policies. Data on the range of attainment is freely available from the NPD, but in itself cannot provide any ‘answers’. The data and relevant correlations must be analysed within an explicit theoretical framework which carries explanatory power.
If closing the gap really is a policy objective[25], practice would need to change at the levels of classroom, school, examination groups, probably government policy on curriculum and assessment and wider economic and social policy. With regard to classroom and school, small-scale methods are required to ascertain the practices and interactions which lead to the range of attainment as measured by tests. In practice, there is a very large and longstanding literature in this area, which could be the subject of systematic reviews.

A second current concern is the realisation amongst politicians that teaching and learning practice is by far the most important in-school factor for pupil attainment. Again, there is a literature, comprising classroom observation of various kinds. It shows that classrooms are complex social settings. All the participants in a class bring a variety of values, understandings, knowledge and attitudes into it. A class develops its own culture, which may or may not be contested. The measured learning of the pupils in the class depends on all these variables.

This constitutes a difficulty for the concept, ‘what works’, which as described above dominates political discourse on evidence informed policy.[26] It cannot be assumed that a teaching practice which ‘works’ for a particular group of pupils with a particular teacher in a particular setting at a particular moment is capable of replication, and if so to what extent. On the other hand, there is a shared body of knowledge within the profession about practice, which should be interrogated as to its real effectiveness, and of

[25] Success in such an objective would have major implications for the purpose of education to accredit pupil performance *differentially*, in order to assist selection for further and higher education and the employment market.
[26] Even Carole Willis, commenting in July 2013 on her appointment as Chief Executive of the National Foundation for Educational Research (NfER), said ‘This is an exciting time for the development and use of robust research and data, with an increasing emphasis from government and from practitioners on understanding and applying 'what works'.’

course some teachers are more effective than others at a given moment. The problem for a technocratic, 'what works' approach is the danger of over-simplification of the learning process.

These two examples illustrate some necessary characteristics of education research. It must:

- be grounded in social science theory;
- recognise the complexity of social phenomena in modern societies;
- use a range of methods as appropriate to a specific research question;
- reflect on the relationship between numerical data and social reality;
- recognise the value of systematic review.

The next section reviews the uses of education research by both policymakers and practitioners.

The uses of research – policymaking

Some elements within the education research community are concerned about the use of research findings. They may describe it as knowledge transfer, knowledge translation, knowledge mobilisation, knowledge adoption, and so on, but the terms refer to the dissemination of findings to both policymakers and practitioners. In both cases, dissemination depends on both push and pull factors; researchers need to find effective means to push their work towards perhaps reluctant audiences, but it is also necessary to find means of removing reluctance and creating demand amongst the two receiving groups.

A European Commission funded project, Evidence Informed Policy and Practice in Europe (EIPPEE) found 269 dissemination activities across Europe.[27] Most of them had been implemented by governments or their agencies, and a majority within the previous decade. Two thirds were concerned with producing and disseminating research, but few addressed research use.

As described earlier the Westminster government entered this area when it commissioned the Hillage report. Amongst its recommendations was one to establish a National Education Research Forum, 'charged with developing a strategy for educational research, to shape its direction, co-ordinate its conduct and support its application… it is clear that to work, any such body(ies) should: be independent of any one party or stakeholder — while it may fall to the DfEE to take the initiative to establish the Forum, it needs to be owned by all participants and not one sectional interest… [and to] seek to identify priority themes for research, drawing on the views of research, policy-making and practitioner communities of the current and future issues of major interest and concern (possibly through a regular foresight exercise).'[28] Although parts of the Hillage package were adopted, the Forum was not implemented.

Even as recently as 2010, the SFRE concluded that 'the aspiration to establish a single, centralised evidence organisation for education, comparable to NICE [now renamed National Institute for Health and Care Excellence] and offering recommendations for policy and practice, should be regarded a step too far'. Instead it recommended a more limited development, the provision of a single 'publicly accessible and user-orientated' UK Education Research Information Service.

Nevertheless, a number of academic institutions work to improve knowledge transfer. Amongst them are the EPPI-centre (Evidence for Policy and Practice Information and Co-ordinating Centre), part of the Social Science Research Unit at the London Institute of Education, and the IEE (Institute for Effective Education) at the University of York. The EPPI-Centre works across a number of public policy areas, including health and education, as does the Alliance for Useful Evidence, which is nested in NESTA, whereas the IEE focuses on education. The IEE also provides the secretariat for a co-ordinating group,

[27] Evidence Informed Policymaking in Education in Europe: EIPEE Final Project Report 2011 Gough D, Tripney J, Kenny C and Buk-Berge E, accessed at http://www.eippee.eu/cms/LinkClick.aspx?fileticket=rN52NrA0dbQ%3d&tabid=3212
[28] Hillage et al, ibid par 6.1.2

the Coalition for Evidence-Based Education (CEBE), which has secured funding to establish an Education Media Centre. This centre will attempt to bring together journalists and researchers and make research findings more accessible.

Apart from higher education, there is a range of other organisations concerned with synthesising and communicating social research findings and issuing guidance to practitioners. They include international charities like the Cochrane Collaboration and the Campbell Collaboration or the English NfER (National Foundation for Educational Research), and agencies close to or part of government, like the Washington Institute or NICE and SCIE (Social Care Institute for Excellence).

There is still no unifying body, such as an Education Research Information Service, to provide a co-ordinated push on evidence for the Westminster government on education, but the active organisations have the potential to work towards such a goal. However, as indicated above, there has been a lack of pull, or effective demand, from government. In a speech to the National Education Trust conference, 'Research policy and practice: redrawing the boundaries' on 3rd May 2012[29], the former Secretary of State Estelle Morris confirmed the earlier description by Wells[30] that governments are good at conducting evaluations of policy implementation but unwilling to use evidence to inform policy development. Morris pointed out the pressure on ministers from the public, media, and other political parties which militates against 'being faithful to research' especially if the findings are counter-intuitive, such as the utility of homework. Morris warned that political opinions are often based on values rather than evidence.

Since 2010 there has been a new rhetoric from government about the place of evidence in policy. In a speech at the National College in July 2010, Michael Gove said …'I want to see more data generated by the profession to show what works, clearer information about teaching techniques that get results, more rigorous, scientifically-robust research about pedagogies which succeed and proper independent evaluations of interventions which have run their course. We need more evidence-based policy making, and for that to work we need more evidence.' Gove often refers to a commitment to evidence, and states what the evidence shows; for example, in an article headed 'Free schools are a success – but will Ed Miliband dare admit it?' on 1st August 2013[31] he wrote 'My approach to education reform is the opposite of Labour's. It's rooted in evidence, not ideology. I believe in following the Blair dictum: what's right is what works.' Gove also frequently cites PISA evidence in support of policy ideas, often in a generalised manner. This commitment is not confined to the DfE. The 2011 Cabinet Office white paper 'Open public services' contained a commitment to investigate a NICE for social policy, and this was repeated in the 2011 Civil Service Reform Plan.

In the same year, the charity the Sutton Trust was awarded a grant of an astounding £125 million by the DfE and established another charity, the Education Endowment Foundation, which followed its parent in 'a vision to break the link between family background and educational achievement'. It sees its role as being 'to identify, develop, support and evaluate projects to raise the achievement of disadvantaged children in the country's most challenging schools. We have a particular focus on innovation and on scaling-up projects which are cost effective and replicable.'[32] Its technocratic approach was emphasised in its statement 'Proving what works is at the heart of everything we do.' The grant enabled the EEF both to invest for future activity and also to make a number of awards to researchers. As of August 2013 it had committed almost £25 million to 55 projects. Its independence from the donor was formally signalled by the absence of a DfE representative on the Advisory Board.

In March 2013 the Cabinet Office and the EEF came together when the Treasury announced the establishment of the What Works Network. The network consists of six 'centres of excellence', each

[29] accessed at http://www.york.ac.uk/iee/coalition.htm
[30] Wells P 2007 *New Labour and evidence based policy making 1997-2007* People place and policy, 1,1 Sheffield Hallam University Centre for Economic and Social Research
[31] accesed at http://www.theguardian.com/commentisfree/2013/jul/31/free-schools-success-ed-miliband-admit?INTCMP=SRCH
[32] accessed at http://educationendowmentfoundation.org.uk/uploads/pdf/EEF_A5_Booklet.pdf

representing an area of public policy, including NICE, EEF and four new bodies. The network is funded by the government together with the Economic and Social Research Council (ESRC). All the centres have six core functions:

- undertake systematic assessment of relevant evidence and produce a sound, accurate, clear and actionable synthesis of the global evidence base which assesses and ranks interventions on the basis of effectiveness and cost-effectiveness; shows where the interventions are applicable; shows the relative cost of interventions and shows the strength of evidence on an agreed scale;
- produce and apply a common currency for comparing the effectiveness of interventions;
- put the needs and interests of users at the heart of its work;
- publish and disseminate findings in a format that can be understood, interpreted and acted upon;
- identify research and capability gaps and work with partners to fill them;
- advise those commissioning and undertaking innovative interventions and research projects to ensure that their work can be evaluated effectively.

In July 2013 it was announced that Dr David Halpern, Director of the Cabinet Office Behavioural Insights Team, would become the first What Works National Adviser to lead the network and advise ministers. He will also explore the merits of establishing a new post of government Chief Social Scientist. Some government departments already employ senior professionals to offer independent advice, with the chief scientific officer at the Department of Health most often quoted, although the DoH also has five other chief officers relating to the health professions. It remains to be seen which department might employ a Chief Social Scientist.

The above developments indicate an increased pull from the political world for an evidence base to match the push from the research community. However, there are two areas of difficulty within this scenario.

The first is the uncertainty about the real commitment to evidence on education policy amongst politicians in a way which would be recognised by researchers. A full analysis of the downward trajectory of the standards in evidence use by politicians is beyond the scope of this paper. As pointed out earlier, both the government and the opposition, and indeed others, now routinely make a comparison between England and just one other country on a single indicator in order to suggest that the importation of a single practice would raise pupil performance levels. This phenomenon is known in other countries, but is particularly commonplace within English political discourse.

Such cherry picking ignores a huge range of factors which affect the indicator being quoted. These might range from the details of the practices which are linked to the indicator to the social, cultural and economic factors at play in the country. For example, the interest in South Korea as a ‘high performing’ nation leads to suggestions for introducing some Korean practices, but does not stretch to analysing the impact of other practices such as very long learning days with additional tutoring and the mental illness and suicide incidence amongst young South Koreans.

In Michael Gove’s article on free schools mentioned above, his professed commitment to evidence was followed by a quite unjustifiable use of a small item of data without any context, followed by unjustifiable claims for conclusions that could be drawn. The opposition responded to the article with similarly unjustifiable use of the evidence. A full analysis would suggest that the evidence is that politicians have little intention of using evidence in the way they claim.

The second difficulty lies within the territorial claims that have arisen since 1997 in respect of the appropriate concerns of politicians. There were a number of reasons why the introduction of the National Strategies by the first Blair government was controversial, but the most basic objection was that the government should not intervene in such a directive way in the area of the specialist skills and knowledge of professional practitioners. The evaluation of the strategies gave some support to both sides of the argument.

In the speech referred to earlier, Estelle Morris referred to the extension of policymakers into issues of pedagogy, contrasting a party manifesto from the eighties on selective schools with one in 2010 calling for the use of synthetic phonics. Morris made two comments. It is a proper expectation that policy on pedagogy should be evidence based. More, there should be a debate about whether pedagogy *should* be a political question. It has become commonplace for politicians to support 'freeing up teachers to teach' by pointing out that no politician would tell a surgeon how to operate. Sometimes such sentiments are voiced by someone who has indeed told teachers how to teach.

The intrusion of politics into professional practice creates an ambiguity about the appropriate audience for research evidence. Before 1997, policymakers were primarily concerned with system features, such as the impact of a selective structure for secondary schools or of school autonomy. The lesson of a number of strands of research, including the schools improvement movement, that classroom practice is the most important variable amongst school level determinants of pupil performance, led to the political interest in pedagogy. The ambiguity is whether research findings on pedagogy should be aimed at practitioners, at policymakers, or both. In the next section, the extent to which practitioners can generate effective demand for communication about research is considered.

The uses of research – practitioners

The organisations concerned with the use of research evidence are concerned with practitioners as well as policymakers; in some cases, such as the EEF, perhaps concerned (superficially, at least) only with practitioners. The EEF has become the most successful agent of knowledge transfer by means of its Teaching and Learning Toolkit.[33] Presented in a simple tabular form, the kit assesses pedagogic practices summarised in terms of their average impact on attainment, the strength of the evidence supporting them and their cost. The assessments are based on reviews of the research evidence undertaken by a team from Durham University. Behind the summary there is more detailed analysis of the research base as well as the methodology of the toolkit.

According to an NFER survey in March 2013, '… the proportion of teachers saying they read the Teaching and Learning Toolkit when deciding which approaches and programmes to adopt increased from one-in-twenty teachers overall in 2012 to around one-in-seven in 2013. Among senior leaders this increase was from around one in ten in 2012 to over a third in 2013.'[34] Pessimists would regard a one third readership amongst leaders as appalling, optimists would feel that this is a respectable figure in the light of their traditional low propensity to access research findings.

Some universities, including organisations mentioned above, have successfully established networks of practitioners who are committed to professional development by way of engaging with research. Also worthy of note is the work of CUREE (Centre for the Use of Research and Evidence in Education), an independent company which engages with teachers, leaders and schools in order to develop schools as learning communities. All of these organisations are attempting to create practitioner demand for research evidence, but the countervailing pressure on practitioners is significant. Their impact is localised and despite some growth only a small minority of schools yet promote an evidence-based approach to professional development.

The countervailing pressure consists of the current load and pattern of work, largely generated by the high stakes accountability mechanisms. School leaders have learnt that to survive the major necessity is to second guess the expectations of the next set of inspectors. In few schools is staff development regarded as a priority; there is rarely a significant budget or allocation of staff time for training. Teachers

[33] see http://educationendowmentfoundation.org.uk/toolkit/about-the-toolkit/
[34] Ager R and Pyle K 2013 NFER Teacher Voice Omnibus March 2013 Survey: Spending Priorities for the Pupil Premium The Sutton Trust p11

search the web, but for ready to use lesson plans and resources, not for research reviews, even ‘what works’ reviews.

There are three avenues for stimulating practitioner demand. The first is desirable but unlikely in the current political climate: the reform of accountability to release teachers from unnecessary administrative burdens, providing more time for them to reflect on and develop their practice.

Secondly, by government action or by collaboration amongst academic institutions, the establishment of a single body to co-ordinate the work of researchers and reviewers could lead to a higher profile and a more systematic approach to influencing teachers and schools. Current proposals for such a body are discussed in the following section.

Another way of stimulating demand is more direct. Whereas head teachers have a contractual duty to promote staff professional development, staff do not have a contractual entitlement to access it. In a majority of schools most professional development is determined by the school and is related to the institution’s development plan and targets. This often prevents individual practitioners from determining their own development needs and discourages discussion about available development opportunities and their relative effectiveness. Although the coalition government wishes to deregulate teachers’ contracts, the introduction of a contractual right would stimulate reviews by schools of their provision and provide an opening for those advocating the use of the research evidence base by practitioners.

Current proposals

There are a number of proposals and possibilities for government action to improve the evidence base and its uses. Most of them involve a central agency. The work of NICE in the health sector is often cited as a possible model for education. Its role is to produce evidence-based guidance, advice and information for commissioners, practitioners and managers in health and social care. It produces a number of types of guidance including clinical guidelines in four different forms for different kinds of professionals. It also produces quality standards for commissioners in care services. NICE does not commission research; it reviews existing and emerging research. Thus NICE points firmly towards professionals and their practice, and not towards policymakers. It fulfils most but not all of the characteristics set out for the What Works Network.

As a result of the Health and Social Care Act 2012 NICE has also become attached to the DoH as non-departmental public body. Its own description of its relationship to government is: ‘we are accountable to our sponsor department, the Department of Health, but operationally we are independent of government.’ At the same time, the DoH determines the topics for guidance to be developed, although the process is independent. The climate in which operational independence may be real is connected to the history and status of the medical profession, including its relationship to the state. This may be a reason for the high status of NICE itself, and the way its statements are reported in the mass media.

It should not be assumed that there is complete correspondence between the issue of NICE guidance and an effect on the relevant practitioners. As suggested above, a range of factors come between them, such as inertia and contrary marketing by interests such as pharmaceutical companies.

However, there must be doubt as to whether the NICE model could be strictly applicable to education. The nature of research is very often different, with the obvious exception of public health issues. As described earlier, questions of social meaning and competing or complementary theoretical perspectives affect education research to a much greater extent than medical research, making systematic review more complex. It is difficult to imagine evidence based guidance on education practice being perceived as so authoritative as to be unchallengeable.

In addition, the status of non-departmental public bodies attached to the DfE does not resemble that of NICE relative to the DoH. The coalition government has abolished or brought most of them into the department as agencies, leaving Ofqual, Ofsted, and the STRB. Whilst the connections with these bodies are generally informal, they are real. The prospects for any NDPB in education enjoying real operational independence may seem rather small. On the other hand, in its first two years the independent but DfE funded charity, the EEF, does seem to have been allowed independence.

Thirdly, the history, culture and status of education professions has not created the level of protection accorded to the medical professions.

As discussed above, the government professes a commitment to evidence based policy and practice and has introduced the What Works Network. Although the government's intention is that its findings should be used by both policymakers and practitioners, the EEF's work thus far, at least in the public domain, has been aimed at practitioners. In two years the EEF has generated a substantially increased interest amongst school leaders for its reviews of practice. A majority of items reviewed are aspects of pedagogy.

In contrast to its protestations, the government's education policies are very clearly neither determined by nor influenced by the evidence base. For example, the EEF toolkit rates 'performance pay' as having no impact on pupil performance, but the DfE continues to promote it and has secured its introduction. The government has not commissioned systematic reviews related to major policies.

The Labour Party has suggested a new body, the Office for Education Improvement. At the time of writing, this proposal is in development, but as described by Stephen Twigg, Shadow Secretary of State, in February 2012 it would be 'independent of ministers, along the lines of the Office for Budgetary Responsibility. The Office would focus on four major areas: promoting high standards; spreading best practice; acting as a clearing house for research; and aiming to improve England's position compared to other countries. The Office would act as the authority on evidence in education policy, including on the relationship between education and social mobility.'[35] The shadow sounded very much like the substance in saying 'Labour will take political dogma out of the education system and put evidence at its heart.'

In development this proposal needs tighter definitions of focus. All those mentioned would arise from a body whose purpose was to review and analyse research evidence on education issues and, like NICE, to disseminate its findings in different forms for different audiences, including both policymakers and practitioners.

The OBR's establishment and its relationship to politicians are set out in the Budget Responsibility & National Audit Act 2011 and a charter, framework document and memorandum of understanding between it and three government departments, along with a number of service level agreements. These mechanisms ensure a high degree of independence and transparency; for example, minutes of board meetings are easily accessed.[36] It could be argued that in view of the uncertainty about the relationship between the DfE and its NDPBs a similarly formal structure of guaranteed independence would be necessary in the case of an OEI.

The work of the EEF and the OEI proposal both raise the question of whether a central institution should only interpret existing research, or also encourage or commission research where it perceives a need. The Hillage Report supported the larger role. It proposed that the National Education Research Forum should, amongst other things, identify issues which could be illuminated by further research and co-ordinate the research effort to tackle them, as well as bringing together research funders in order to

[35] accessed at http://stephentwiggmp.co.uk/evidence-not-dogma-stephen-twiggs-speech-to-progress/
[36] See http://budgetresponsibility.independent.gov.uk/transparency/governance/

encourage the production of systematic reviews and the dissemination of findings. Although academic institutions might see such a development as inimical to their autonomy, the current realities of research funding already limit autonomy.

A further question is whether a new body is necessary, or whether the EEF or another of the institutions already in the field might be developed for the same purposes. As described earlier, they are many and various, but many focus on dissemination to practitioners. Is there already an institution which has a long record of highly authoritative research, including international studies, and research reviews; which seeks to support both policymaking and practitioners; which understands government, and much else?

Yes. The National Foundation for Educational Research was founded in 1946 and became one of the largest education research organisations in the world. Its reputation for independence and impartiality is second to none, despite its involvement in controversial policy debates during the last half century. Its capacity and authority equip it to take on any of all of the tasks set out by Hillage for a National Education Research Forum.

The NfER portfolio extends far beyond the roles of a National Education Research Forum. It may need to be reconfigured, and perhaps be given a statutory basis like the OBR before taking up such a position. This might not sit easily with its charitable status. In addition, this idea has not been proposed previously, and scrutiny of it may produce serious objections. It may be that a consortium of organisations could undertake the roles, although the issues of coherence and authority would be great.

Conclusion

In the 15 years since David Blunkett commissioned Hillage, progress towards structures that would support the routine use of the education research evidence base by policymakers and practitioners has been patchy. Recent developments, and in particular the political rhetoric within both government and opposition, suggest more auspicious signs.

The work of the EEF may be seen as a step forward, but this organisation has the drawback of appearing to be the property of a sectional interest, and perhaps of being based on the personal favour of a Secretary of State, rather than being the authoritative representative of the whole education research community. Given the controversial nature of education policy, the creation or conversion of such an organisation, with statutory guarantees of independence may be both necessary and timely.

Independence must stretch to the political acceptance of the complexities and uncertainties of both the practice of teaching and learning and also the methods by which that practice can be investigated by social scientists. Politicians must be prepared to abandon the over simplicity of the ‘what works’ mantra. They must also abandon the intrusion of politics into matters which should be solely the professional concern of practitioners, the ‘how to’ of teaching.

However, it will be essential for politicians to embrace the overarching purpose of such a body: to make a contribution towards improving the experience and achievement of all learners in our education system, from cradle to grave. This purpose requires at least as much attention to the pull factors, the demand for evidence from practitioners, as the push factors, the supply of that evidence by the research community. Politicians need to review the real current working experience of practitioners in order to accentuate those features which encourage an enquiring approach to pedagogy, but particularly to review policies which undermine the capacity of practitioners to reflect on their work and access the kind of development opportunities which have real effects in their classrooms.

One of the most encouraging features of political rhetoric in recent years has been the recognition that, as McKinsey famously put it, ‘the quality of an education system cannot exceed the quality of its teachers’. Teaching is at once a craft, an art and a science, and the quality of the teaching force will be

enhanced by its increased knowledge of the scientific evidence about teaching and learning. Some organisations in the field are making significant contributions to this enhancement, but the effects are localised. These activities need to be generalised across the teaching force.

While innovation and some of the best pedagogical practice in the world is to be found in our schools, current policy directions affecting the teaching force are reducing morale. The replacement of current sticks with the carrot of relevant professional development for all would allow our best practice to become the norm.

BERA

Summary of main points

- Structural and institutional factors shape the capacity and health of the education research community and the potential for research-informed policy and practice to thrive.

- Different conditions for educational research exist within and across the four nations of the UK.

- Optimal conditions for high quality educational research to transform education include

    i) when the benefits of the diversity of approaches to educational research are well understood, including how each can best be used to answer different kinds of educational questions
    ii) when interactions between policymakers, researchers and practitioners are based on mutual respect and shared purposes
    iii) when the independence of educational research and its critical capacity to ask challenging questions about current assumptions are both recognised and supported.

We have organised our submission using the headings from the call under Questions for Researchers. Our answers relate to our work as a learned society.

1. What broad area of educational research do you work in, and what is your role?
   BERA is a learned society and charity committed to working for the public good. Our charitable purpose is to encourage the pursuit of educational research and its application for both the improvement of practice and the public benefit. BERA is the largest UK-wide educational research organisation with almost 2,000 members organised into over 30 Special Interest Groups. As an international association with both UK and non-UK based members we organise the largest annual conference of educational researchers in the UK, with participants from over 30 countries, and are well-networked with sister organisations in Europe, the USA, New Zealand and Australia. Further information can be found at: www.bera.ac.uk

   BERA's core aims are to: advance research quality; build research capacity and support research engagement in the education field. Our activities are focused on sustaining a strong and high quality educational research community that can enhance the field of education through the growth of public knowledge and critical understanding.

2. Describe the contribution your field has made to educational research, policy, teaching and learning, and society?
   Through its activities as a learned society, BERA supports and encourages high quality research in all its forms. Our networks, events and annual conference encourage the active participation of members from diverse backgrounds, working in different educational sectors and as independent researchers in third sector organisations. Many of our members are actively engaged in working with policymakers and practitioners: to inform and evaluate policy and practice; to develop new lines of enquiry that will benefit the field; and challenge assumptions where the evidence base is weak. At our latest annual conference we had strong submissions on these topics from Special Interest Groups focused on: Social Justice; Teacher Education and Development; Educational Research and Educational Policymaking; Inclusive Education; and Curriculum Assessment and Policy, with papers drawing on diverse methodologies and theoretical perspectives. Many papers reported on projects where research engagement was key.

The contribution that high quality educational research makes to policy, teaching and learning and society is well attested in the Research Excellence Framework (REF). 30% of the educational research entered was judged to be world-leading, and almost all of the submissions to the Education sub-panel included at least some 4* publications. 43% of impact activity was judged to be outstanding in its reach and significance and 48% of the submissions demonstrated environments judged to be conducive to producing work of world-leading quality. Ensuring the health of the discipline in all its parts is central to BERA's mission. We regularly review with our members the challenges and opportunities the education field faces. (Christie et al, 2012; Oancea and Mills, 2015).

3. In the past 10 years, what would you judge as the most significant contributions your field has made?

In the past 10 years, the most significant contributions in the field have often developed through the complex interactions between policy, research and practice. The quality of the Impact case studies submitted to the last Research Excellence Framework exercise provides clear evidence of the success that educational researchers have had in influencing education policy and practice. The Academy of Social Sciences will draw on some of the best examples in their publication, *Making the Case*: *Education*, the latest in their series outlining the case for the social sciences. This will be launched on 7th December 2016 at the House of Commons, hosted by the Chair of the Commons Education Committee. The increasing use of quantitative and mixed methods is particularly notable. The REF panel commented, " the growing volume of outputs deriving from large-scale datasets and longitudinal cohort studies was particularly impressive and a high proportion was judged to be internationally excellent or world leading" (REF, 2014, p108).

Key research contributions in the last decade have included:

- ideas on how to shape system reform (e.g. school effectiveness and improvement);
- large-scale and longitudinal studies that have provided new data on teaching quality and its impact on equality of outcomes (e.g. the Effective Provision of Pre-School Education project (EPPE) and Effective Provision of Pre-School, Primary and Secondary Education Project (EPPSE)), and can be mined to tease out key messages for educators using the various cohort studies such as BCS and MCS;
- methodological and conceptual advances in understanding how knowledge is built and sustained within different communities of practice (e.g. the shift from evidence-based to evidence-informed practice, or from knowledge transfer to knowledge exchange and mobilisation) and how these understandings can be used to build more effective partnerships with policymakers and practitioners;
- in collaboration with new funders such as EEF, the increased interest in the use of RCTs and systematic reviews in education and how these can best be harnessed in building a secure knowledge base to tackle social inequalities in education;
- theoretical developments in understanding how policy shapes educational change, both nationally and internationally (e.g. the concepts of policy trajectories, enactments, networks and assemblages, from policy sociology; and the close scrutiny in international and comparative studies of the metrics, models and measures used in e.g. OECD and UNESCO datasets);
- enhanced definitions of research-informed practice that can usefully underpin initial teacher education and transfer into a rounded conception of teacher professionalism; and
- appreciation of the diversity of perspectives that can be used to address different kinds of educational questions in ways that open up critical and informed debate e.g. the role of economics of education in shaping key aspects of policy thinking, but also questioning some of the basic assumptions that have been brought into play

This has led to a greater understanding in the field of the value of different research methodologies and more interest in developing interdisciplinary research teams that can tackle difficult problems using a mix of methods.

4. What are the priorities in your field of educational research, and what is driving these?
Our priorities are to maintain the strength, quality and diversity of the educational research community and its capacity to transform practice and contribute to the public good. BERA is very aware of the structural and institutional factors that help shape the capacity and health of the education research community, and we keep a watching brief on this through our Observatory reports (Oancea and Mills, 2015).

   We have two immediate priorities:

   i. To build capacity in the education research field. There are a number of pressures on the field, and an urgent need to invest in bringing on the next generation of researchers, given the ageing profile of the research community and the increasing use of teaching-only contacts in the field. Research income has reduced by 23% between 2009 and 2013. ESRC doctoral funding for the field of education fell by 50% between 2011 and 2013, Of the 4850 FTE students registered in 2013 for an education postgraduate qualification, 60% were part-time and 78% were aged 30 or over.

   BERA is aware of the need to improve these figures in terms of overall amounts, inequalities within and across the UK nations, and support for new and early career researchers and also mid-career researchers especially in institutions with little or no research funding.

   ii. To defend teacher education in terms that exemplify and develop a well-rounded concept of teacher professional judgement and research-informed practice (BERA/RSA 2014). This is currently under threat in England from policies that are systematically weakening the role of research in shaping teacher practice, through the way in which teaching standards are framed, and the move to switch teacher education from the university sector to other suppliers. Many of these do not have the resources to make such courses research-led or research-informed in terms that will make a difference to trainees' developing practice.

   BERA strongly advocates building sustainable education systems in every region of the UK, in which teachers know how to source, evaluate and use the best research evidence to answer their questions and have opportunities to engage in research and enquiry (BERA/RSA, 2014). The education research community clearly has a vital role to play here.

5. What particular barriers and challenges do you face in undertaking educational research, and what changes might help overcome these? Please say whether these barriers and/or challenges apply to 'blue skies' or 'applied' research.

   Educational research has much to contribute to the wider field through both 'blue skies' and 'applied' studies. Indeed, both kinds of research are relevant to questions in policy and in practice. However, there are particular challenges in maintaining the health of the field.

   Although Education did very well in the last REF, with the proportion of 4* work comparable to other units of assessment, the proportion of 1* work submitted (7%) was the largest recorded across the REF exercise as a whole, while the 'research intensity' score of 27% was the lowest for any unit of assessment (Pollard, 2015). In many respects these reflect some of the structural and financial pressures the sector faces, not least because of the uncertainty surrounding the future of ITE in the university sector, when this is core business for many departments (See Christie et al, 2012 and Oancea and Mills, 2015). This is reflected in an increasing use of teaching-only contracts in many departments.

With a devolved administrative settlement for education, educational researchers now find themselves working under very different conditions in the four nations of the UK. It is harder in England to find evidence of the kind of longer-lasting and productive co-partnerships between researchers and policymakers that have driven education reform in Scotland and Wales and which are supporting new ways of working across stakeholder groups. (For an example of the latter, see, the Public Policy Institute for Wales (PPIW), an organisation that 'brokers' between policy communities and researchers, to provide fruitful partnerships between research and practice. A good example of their work is the initiative on high quality vocational education (PPIW 2016), which brought together the fruits of past ESRC-funded and international research to assist policymakers.) BERA ensures members from each of the four nations are represented on its Council and in its committees, and where possible rotates events geographically, so that knowledge-sharing across the four regions continues and we can learn from each other.

In general terms, increased competition for the limited sources of monies available to support either blue-skies or applied research of high quality is putting some strain on university education departments. Some have recently been re-organised into larger social science faculties or schools. Whilst this may have some advantages in terms of locating educational research more firmly within the social sciences, some of the potential benefits of "close-to-practice" research may also be lost. Yet this is a crucial and necessary element in developing teaching as a research-informed profession. (Leach, 2015)

We are currently in the process of re-scoping our Observatory report so that it can enable us to better track developments in the field that may impact on the health and sustainability of the education research community. We are aware of the growing presence of third sector organisations who actively compete for funding and who may also function as a new destination for early career educational researchers. (Our Independent Researcher Forum is designed to support those working in this area.) We would like to take this into account, alongside other structural and financial factors that may affect both the composition of the education research field and its longer-term viability.

Creating better public understanding of the value of educational research and the contribution it makes to ensuring all children have access to a high quality education may be a crucial ingredient in changing the policy environment. The increasing awareness amongst practitioners of the importance of ensuring that teaching is an evidence-based and evidence informed profession is an important step. We welcome the Royal Society and British Academy initiative and the attention it will bring to some of these issues.

6. What opportunities (including opportunities for dissemination) exist to deepen the contribution that your research field makes to policy, teaching and learning, and society?
Opportunities that exist to deepen the contribution that educational research makes to policy, teaching and learning and society more broadly depend upon a policy settlement that recognises the independence of research and its critical capacity to ask challenging questions about current assumptions, as well as provide valid and reliable evidence that supports current lines of approach. By and large researchers work to achieve these ends, almost regardless of the prevailing conditions.

In England, as central government has withdrawn funding for research it commissions itself, and in some respects made working in partnership with policy and practitioners harder, so researchers have found other ways to pursue these goals. Recent teacher education policies here have driven educational research and professional formation in different directions, and led to a reduction in university-based research opportunities and capacity. By the same token, there has been an increase in educational research undertaken elsewhere, although there is a risk that this may lead

to a reduction in sustainability and a decrease in the independent quality that derives from critical peer reviewed research.

BERA membership is being increasingly sought by school-based practitioners, and we are aware that this is an area which could benefit from further development. We already co-opt school-based members onto our committees. We also fund an annual BERA-BCF Curriculum Investigation Grant to support BERA members who are based within schools and colleges in undertaking research-based inquiry. This follows the incorporation into BERA of the British Curriculum Foundation, an organisation which itself was set up to promote the study of the curriculum and enable practitioners to engage with research.

In reviewing the REF 2014 results, BERA has recognised the importance of strengthening "close to practice" research, much of which may be very important in the setting in which it is conducted. When well-conducted, such research has a significant role to play in creating a self-improving, school-led and research-informed education profession. Like others in the field (Leach, 2015) we are committed to exploring how the research community can increase the quality of this kind of research and its public value.

7. How do you disseminate your research?
We have a significant role in disseminating high quality research through a range of channels including our distinguished portfolio of scholarly journals (*British Educational Research Journal*, British *Journal of Educational Technology* which are in the Social Sciences Research Index, *The Curriculum Journal*, and *Review of Education*). We facilitate active discussion in the research community through the BERA blog, a regular magazine, *Research Intelligence*, and a weekly emailed Newsletter to all members. We have established new Forums to actively support PGR and Independent researchers in networking with each other.

   Our annual conference and in-year SIG activities promote the exchange of ideas and the formation of new networks. We make a number of awards to recognise: outstanding career long contributions to educational research; significant research that has public impact; and outstanding publications, Doctoral and Masters theses. In 2015/16 we funded three Research Commissions to identify how educational research can best respond to the challenges and opportunities raised by the changing nature of the education field. The selection process emphasised that each Commission should build in pathways to impact that would engage practitioners and policy-makers and foster new partnerships. This was a new departure for BERA which early evaluation suggests has been of benefit. From time to time, we have undertaken a number of joint inquiries with other organisations looking at research capacity (Christie et al, 2012) and research and teacher education (BERA/ RSA, 2014). These have led to events at the House of Commons. BERA members have also acted as advisors to the Education Select Committee.

8. Are there demonstrations of effective links between educational researchers, policy-makers and practitioners in this country, or internationally, that the Working Group should be aware of?
We believe this question is best answered through individual responses and submissions as the breadth of good work BERA members undertake would not sufficiently be represented by a summary here.

Computing at School

One-page summary of response

1. How do educational research findings inform your work?
   The work of CAS both:
   - utilises research findings through informing policy discussions, developing procedures and providing advice;
   - informs the research agenda through its engagement with academia through the community forum and various working groups.
2. How easy do you find it to identify, access and make use of educational research?
   The two main challenges are:
   - the lack of research capacity (with very few UK-based educational researchers actively studying the pedagogy and assessment of school-level computing Contact info)
   - the lack of reliable research funding.

3. What would be your priorities for educational research?
   The focus of research in the teaching of computing would bring a better understanding in a number of important areas:
   - pedagogy associated with computer programming (building on the research into teaching programming in higher and further education and vocational training) to ensure efficiency and effectiveness in building the next generation of computer developers;
   - cognition associated with computational thinking and its implications for raising thinking skills competences generally across the curriculum and in life activities developing more logical and clear thinking citizens of tomorrow;
   - assessment of attainment and progress in computing including formative as well as summative aspects to support both effective teaching and learning but also fairer and more accurate judgements about our pupils;
   - teachers' content knowledge and pedagogical content knowledge to better inform policy and practice in continuing professional practice;
   - computing for all and aspects of inclusion to better understand and address the social issues including, for example, gender imbalance.

4. Effective links between practitioners, policy-makers and researchers
   CAS has an important role in uniting interested researchers and that results in collaborative work across academic, charitable and commercial institutions.
   What is needed is to draw together these disparate activities is an initiative to kick-start research in computing at school, to get the self-reinforcing cycle working upwards not downwards.
   What is needed is a properly funded research programme to bring a greater understanding of the computing curriculum and the inter-relationship of the principles and concepts. The research outcomes will focus upon teachers' developing practice and establishing the principles of the pedagogy of computing.

CAS's response

The new English national curriculum, launched in September 2014, embodies a root-and-branch reform of the old ICT curriculum. **In particular, it establishes computer science and computational thinking as a rigorous subject discipline that, like mathematics or natural science, every child should learn from primary school onwards.** The new programme of study is here.

We know for a fact that the rest of the world is looking at the UK with intense interest. In his letter to the UK Secretary of State for Education, the President of Informatics Europe said,

"An initiative of this calibre is only possible under sustained institutional policy support. We know that CAS's achievements have only been possible through partnership with the UK Department for Education, and we praise the contribution that your Department has made to the reform of the computing curriculum. This reform is a huge step in the right direction. We are all watching with great interest what the UK has done, and look forward to observing further progress."

Other subjects have hundreds of years of experience in effective pedagogy and robust assessment techniques; computer science has virtually none. Early work goes back to Seymour Papert, but in the last decade or two most research has been focused on university-level computing education and vocational programming. After all, during that time, very little computer science has been taught at school, so there has not been much to study!

So there is a crying need for practically-oriented, evidence-based educational research into the pedagogy and assessment of computer science as a school subject.

This research is sorely needed, for very practical reasons. Lacking it, teachers will simply fly by the seat of their pants, and we will miss out on learning from what works and what doesn't, except anecdotally. The UK is, in effect, pioneering a brand new subject in every school in the land, whose results are of direct interest to the rest of the world. You would therefore expect our classrooms to be full of academics with clipboards, studying the changes, evaluating different teaching techniques, and measuring effectiveness. Yet virtually nothing of the kind is happening.

There are two problems:

1. **Lack of research capacity**. Very few UK-based educational researchers are actively studying the pedagogy and assessment of school-level computing.

2. **Lack of research funding**. Research grants are hard to get. In practice, the principal source seems to be the Education Endowment Foundation, but they are (quite reasonably) focused on randomized control trials, on numeracy and literacy, and on disadvantaged children. These are good priorities, but are a poor fit for computing. RCTs are good when you have a couple of approaches to compare, but we have dozens; we need cheaper but broader methods at our stage of development.

Of course, these two problems are self-reinforcing. A lack of funding drives academics away; a lack of capacity leads funders to believe that demand is low.

What is needed is an initiative to kick-start research in computing at school, to get the self-reinforcing cycle working upwards not downwards. A properly funded research programme is needed to bring a greater understanding of the computing curriculum and the inter-relationship of the principles and concepts. Its outcomes will focus upon teachers' developing practice and establishing the principles of the pedagogy of computing.

Use of research in Computing Education

There is an interest in research to inform Computing Education within the CAS community. However, it is not easy for CAS members to identify and make use of educational research around computing in schools because much of the research is at an early stage and joined-up meta reviews are not yet available. There is an urgent need for more funding to produce translational research that is accessible to teachers and can be utilised in the classroom.

However, research about the use of unplugged activities, computational thinking and reading and tracing code is utilised by teachers to some extent, as shown by a recent paper on strategies and challenges in the Computing curriculum. Other research conducted by members of the CAS community is made available here* and both CAS TV and the twitter group #caschat have featured research in order to

support teachers in being able to become research-aware. *
http://community.computingatschool.org.uk/resources/46

Priorities for research

There are important areas which we need to research in computing education – the results of which would have impact upon the standards of teaching and the attainment and progress of pupils in learning through computing.
Research at university level on the learning of programming can be utilised, replicated and built on but there are some very basic needs for research about Computing in school. These can be grouped into three areas:

1. Research in primary and lower secondary computing education: sequencing of learning goals, key concepts, acquisition of computational thinking skills, how to assess, both formative and summative, misconceptions and threshold concepts in computing for young children, etc.
2. Research around teachers and pedagogical content knowledge: what teachers need to know, pedagogical strategies that work, developing teachers as confident computing teachers, etc.
3. Research into computing for all: making computing accessible by all children, diversity and differentiation, computing across the curriculum, etc.

Research into these areas is just beginning and communities of researchers are working internationally through networks such as the WIPSCE. The UK Is not well represented in the international research community as we have few research groups at universities in the country and only a handful of PhD students working on topics such as these.

Links between practitioners and researchers
As a subject association for Computing we engage with many academics as well as practitioners and focus on collaborative work between them. One particular project has been the Teaching Inquiry in Computing Education project in which academics worked with teachers to support them with action research projects - across the country and in a range of institutions and schools. Enabling teachers to carry out research directly in their classroom is not only in-depth professional development, but also generates an awareness of the importance of research in informing teaching practice.
In general the work of CAS unites interested researchers and results in some collaborative work across institutions. CAS has been at the forefront of curriculum change and is respected by industry and teachers alike. It has provided the focus for government and industry investment in CPD, providing resources for learning and the development of a community of practice.

Rather than complain about the lack of research, CAS is committed to getting on with research activity anyway; but we lack sufficient investment to maintain or develop this work. This section outlines what we are doing.

CAS has a research special interest group that meets regularly. Representatives include experienced University researchers; early career researchers, students pursuing their first postgraduate research degrees and teachers with a general interest in research. CAS Research is an informal group of people who are working together to try to achieve the following (ambitious) goals:

- To support teachers wishing to become engaged with research by carrying out small research projects
- To set up resources around existing research to enable teachers to see where evidence exists for particular aspects of pedagogy
- To collaboratively work on, and share, research in the field of computer science education in schools

So far they have worked on the following:

- Introducing a research strand at the CAS Conference. This ran for the first time in June 2015 and again in June 2016. Sessions included: teachers reporting on their own research projects, summaries of recent research findings and support in setting up your own research project.
- Carrying out a classification of relevant literature in the area of computer science education in schools.
- Launching a project called Teacher Inquiry in Computing Education which ran last academic year and produced a summary of teacher research projects, an academic poster, and which was presented at the CAS Conference 2016 by teachers.
- Setting up a support group to support PhD students working in the area of computer science education research.

This initiative is funded indirectly by contribution from industry partners but requires a more permanent funding stream if it is to have a sustained impact.

Another initiative is the BCS Certificate in Computer Science Teaching. This is having an impact on the amount of formal classroom-based investigation as it is a requirement that teachers receiving the award carry out and write up some research associated with the teaching of computer science in school. This initiative requires head teachers to recognise the value of research and fund their Computing staff through the certification process.

Education Workforce Council

1. What broad area of educational research do you work in, and what is your role?
    - The Education Workforce Council (EWC) is the independent regulator in Wales for teachers in maintained schools, Further Education teachers and learning support staff in both school and FE settings. There is also an intention by Welsh Government for the EWC to regulate Youth Workers and people involved in Work Based Learning from 1 April 2017.

    - The principal aims of Council are broadly to improve the standards of teaching and quality of learning, and to safeguard learners. Our education research can therefore be wide-ranging and is informed by both national and organisational priorities. The EWC also has a role as facilitator in that it aims to stimulate research engagement amongst its registrant groups.

2. Describe the contribution your field has made to educational research, policy, teaching and learning, and society?
    - The EWC works closely with Welsh Government and other stakeholders and supplies them with valuable data and insights to inform their workforce planning and policy development.

    - The EWC is currently undertaking the first national workforce survey on behalf of Welsh Government which covers all registrant groups. The resultant analyses will enable Welsh Government to address the key issues within the workforce and develop policy accordingly.

3. In the past 10 years, what would you judge as the most significant contributions your field has made?
    - The EWC was only created in April 2015, through the Education (Wales) Act 2014, which reconfigured the General Teaching Council for Wales into the EWC. In our answer to this question we will be referring to work undertaken by the General Teaching Council for Wales as well as work completed by the EWC.

    - One of the key contributions the EWC has and can make in future is in the intelligent use of the unique data on our Register of Education Practitioners. For example, we hold workforce data on matters such as gender, age, ethnicity, disability, welsh language skills and qualifications. Examples of the Council's extensive workforce data may be found in the 'Research and Statistics' section of its website.

    - From 2004 – 2007, The GTCW worked to produce a suite of advice documents focused on teachers' professional learning, the 'Professional Development Framework'.

    - In 2014 the GTCW conducted a supply teacher survey. The findings of the survey have directly shaped policy, contributing to the establishment of a 'supply task force' looking into support and continuing professional development for supply teachers.

    - The GTCW administered Welsh Government funding to support teachers' professional development between 2001 and 2010. This scheme included supporting practitioner research projects.

    - Between 2011 and 2014, the GTCW was involved in a pan-European project, 'Policy for Educator Evidence in Portfolios (PEEP).

    - The EWC hosts a web-archive of research projects from the Welsh Government funded Masters in Educational Practice (MEP) on its website.

1. What are the priorities in your field of educational research, and what is driving these?
    - Part of the EWC research strategy includes ensuring that as an organisation we look for opportunities to respond to calls for evidence and consultation responses which impact upon the education sector. This could involve using the information we hold on the register of practitioners. In this sense, the work is reactive and driven by the current demand. This is, however, considered a priority area as it has the potential to influence policy and it is imperative that as an organisation we maximise the use the data we hold about the education workforce in Wales which is not available anywhere else.

    - A sizeable proportion of EWC research is commissioned by Welsh Government and therefore will reflect national priorities. Self-directed work will be influenced by issues which have been highlighted via reviewing our own data trends in relation to the education workforce, or research activity may be prompted by discussion with stakeholders.

2. What particular barriers and challenges do you face in undertaking educational research, and what changes might help overcome these? Please say whether these barriers and/or challenges apply to 'blue skies' or 'applied' research.
    - As an organisation we have recognised the importance of undertaking greater analysis of the unique data we hold on the register of practitioners and education research to support policy development. For this reason the EWC has recently created two new posts to strengthen our research and data analysis capacity.

    - As a small organisation, membership of research associations and associated attendance at relevant training / seminars, research interest groups is limited and sometimes cost-prohibitive; this means fewer opportunities are available to network and benefit from best practice.

    - Educational research in Wales is perhaps not as dynamic as other parts of the UK. There are difficulties identifying where there may be opportunities for joint working / collaboration and identifying what research is currently being undertaken elsewhere in Wales.

3. What opportunities (including opportunities for dissemination) exist to deepen the contribution that your research field makes to policy, teaching and learning, and society?
    - Increased collaboration with UK counterpart teaching councils and other professional regulators. The EWC is currently embarking on a joint research project with the teaching councils of Ireland and Scotland to look at the specific areas of transition and wellbeing.

    - There are opportunities to work more closely with Wales Institute of Social & Economic Research, Data & Methods (WISERD) to look at data linkage opportunities to increase the impact of research and fully exploit the power of the data we hold. This is currently under discussion.

    - Increased involvement / collaboration with research associations such as the British Education Research Association (BERA).

4. How do you disseminate your research?
    - The EWC has recently established a Research Engagement Group comprised of key academics in the field of education, as well as research-active to practitioners. The aim is to work collaboratively to raise the profile of education research and to make it more accessible to practitioners. It also seeks to stimulate discussion about education research and facilitate the sharing of best practice and ideas. Members can share their own personal research outcomes with each other via this forum in addition to updates from their institution.

- The EWC has recently established links with WISERD. WISERD hold education-focused lunchtime sessions on a regular basis, inviting key stakeholders to present their research findings to those with an interested in education. The EWC has recently presented its findings in relation to Initial Teacher Training which was very well attended and generated a lot of interest in the unique data we hold. There are plans to increase this activity in order that research reaches a wider audience. It is intended that future large scale research will be presented at briefing sessions to which policy makers and key education stakeholders will be invited.

- The EWC publishes its consultation responses and research papers on its main website in bilingual format and also publish research blogs. We communicate regularly with registrants via our newsletter, and to a broader range of stakeholders via social media, ensuring they are signposted to any new material as it is published.

- The EWC is looking at opportunities to enhance its approach by exploring options of conducting webinars, Twitter hours etc. In our role as facilitator we also encourage key figures in education to write topical education-based blogs which are published on our website.

- The EWC holds an annual event 'Professionally Speaking' which brings in academics and key public figures to promote discussion about education from the perspective of both policy and research. Professor John Furlong and Professor Graham Donaldson spoke at the November 2015 event.

5. Are there demonstrations of effective links between educational researchers, policy-makers and practitioners in this country, or internationally, that the Working Group should be aware of?
    - The EWC has referred to a number of its own linkages above, for example with the Welsh Government, other stakeholders and academic. In addition, the Council has made links with the Public Policy Institute for Wales which is responsible for providing the Welsh Government with authoritative independent analysis and advice. It was noted that there were commonalities between organisations in terms of research areas, and an opportunity to work more closely. Regular meetings will be scheduled to ensure that both parties are kept abreast of key issues in the sector.

Gatsby Charitable Foundation

Summary of main points

- The Gatsby Charitable Foundation values and supports high-quality education research, which we see as playing a key role in enhancing technical education provision.

- Technical education is an underrepresented area in educational research within the UK, and there is therefore a lack of empirical evidence available about it to inform policymaking.

- We contribute to building capacity in technical education research by commissioning and publishing work in this area, which we use to inform and influence policy discussions and positions.

- We think a multi-agency approach should be taken to continue developing the number of researchers and amount of research being undertaken about technical education.

Introduction

1. Gatsby is a foundation set up in 1967 by David Sainsbury (now Lord Sainsbury of Turville) to realise his charitable objectives. We focus our support on a limited number of areas:

    - Plant science research
    - Neuroscience research
    - Science and engineering education
    - Economic development in Africa
    - Public policy research and advice
    - The Arts

2. As part of our support for science and engineering education, Gatsby has a strong interest in the growth and promotion of the technician workforce. Technicians are the linchpins of the UK economy, delivering integral support for productivity in many of our country's high-growth areas, including the aerospace, chemical, information technology, engineering and manufacturing industries. Ensuring that we maintain a high-quality technical education system is an essential part of delivering a strong and aspirational technician workforce.

3. Gatsby values the role that research plays in improving the quality of technical education and are keen to support high-quality research in this area.

4. We see technical education as distinct from vocational education; a phrase which 'in policy terms has often been treated as a catch-all term for everything other than GCSEs, A levels and degrees' (Report of the Independent Panel on Technical Education, p. 23).

5. By technical education, we refer to the provision of programmes which 'focus on progression into skilled employment and require the acquisition of both a substantial body of technical knowledge and a set of practical skills valued by industry. Technical education covers provision from level 2 (the equivalent of good GCSEs) to higher education but it differs from A levels and other academic options in that it draws its purpose from the workplace rather than an academic discipline' (Report of the Independent Panel on Technical Education, p. 23-24).

Building technical education research capacity

6. The July 2016 publication of the Report of the Independent Panel on Technical Education and Post-16 Skills Plan indicates that technical education reform is high on the education policy agenda. Nevertheless, it remains an underrepresented area within educational research, leading to a paucity of evidence available to inform policymaking.

7. As the Government seeks to make evidence-based decisions on the future of technical education in the process of implementing the Post-16 Skills Plan, it is crucial that developing this area within educational research is prioritised.

8. Although some progress has been made in increasing the support available for research in this space, such as the launch of CVER (Centre for Vocational Education Research) in March 2015, we believe there remains work to be done in building research capacity for technical education.

9. One of the ways in which Gatsby seeks to contribute to capacity building is through commissioning and publishing relevant research, with the aim of using this research to inform and influence policy. In addition to funding large empirical studies, we also commission smaller exploratory studies and think pieces, which can enable us to discover where there might be value in undertaking more significant pieces of research.

10. One issue we have identified through funding technical education research is that much of the expertise in this area lies with senior researchers. In other words, there do not appear to be many UK-based PhD students, post-docs or early career researchers who are emerging experts in this area. Through conversations with academics specialising in relevant topics, we have learnt that technical education is not particularly well represented within education departments at UK research institutions. Therefore, students are not necessarily introduced to this as a possible topic area early on enough during their postgraduate experience, such as when they are at master's level, to consider it as a focus for their research career. Without addressing this situation, there is a substantial risk that we face a future in which we do not have the research required to make informed, evidence-based policy decisions about technical education.

11. As part of Gatsby's commitment to solving this problem, we are funding three PhD studentships (one of whom started their PhD in October 2016, with the other two due to begin in October 2017) in order to support research about technical education in the UK. These students are to be supervised by experts within technical education research, and their research will be directly linked into current policy issues identified through collaboration with Gatsby.

Recommendations

12. While we believe that funding PhD studentships in technical education is an important step in the right direction, we think addressing the need for substantial research capacity in technical education necessitates a joined-up, multi-agency approach. There must be closer alignment between funders, researchers and policymakers if we are to make a long-term, sustainable difference to this area.

13. In addition to contributing to capacity building, we think a more collaborative approach to supporting technical education research would contribute to the country's ability to support upskilling existing researchers in order to make the most of new opportunities, such as the availability of longitudinal education outcomes (LEO) data. We believe that investing in the development of researchers is an essential aspect of both growing evidence and also increasing the quality of educational research.

14. At Gatsby, we are always eager to form partnerships with organisations who share our goals and would therefore be open to working with other like-minded partners on this issue. One example of

how to make this work better might be that an umbrella organisation, such as the ESRC (Economic and Social Research Council), could look to establish a consortium of funders to create a pot of money into which technical education researchers could bid to stimulate interest in the area. A model like this is one which Gatsby would be interested in discussing further if other funders were also willing to be involved.

15. In order to implement technical education reforms that can deliver a strong and aspirational technician workforce, we must have a foundation of robust evidence about technical education. Investing in high-quality technical education research and the development of technical education researchers are both essential drivers to achieving this aim.

Institute of Physics

The Institute of Physics is a leading scientific membership society working to advance physics for the benefit of all. We have a worldwide membership of more than 50,000, from enthusiastic amateurs to those at the top of their fields in academia, business, education and government. Our purpose is to gather, inspire, guide, represent and celebrate all who share a passion for physics. And, in our role as a charity, we are here to ensure that physics delivers on its exceptional potential to benefit society. Alongside professional support for our members, we engage with policymakers and the public to increase awareness and understanding of the value that physics holds for all of us. Our subsidiary company, IOP Publishing, is world leader in scientific communications, publishing journals, ebooks, magazines and websites globally. We welcome the opportunity to submit evidence to the committee.

The Institute of Physics welcomes the opportunity to feed in to the Royal Society and British Academy's joint project. Below, we provide a brief overview of the kinds of use we make of educational research as an organisation as well as the areas we see as priorities in improving the utility of educational research. In particular, we believe there should be greater moves towards subject-specific educational research. We would be very interested to provide further input to the project partners as this work develops.

1. How do educational research findings inform your work?

   The IOP relies on educational research to inform our work in three main ways.

   1. To develop teaching resources that are informed by evidence;
   2. For informing policy and advocacy work;
   3. For devising activities for addressing evidenced problems in the system.

   The first two cases tend to rely on general educational research and statistical analyses. The third draws on physics education research (PER). Examples of the types of work include:

   - The development of our Improving Gender Balance pilot project[37]; the introduction of a mentoring programme for early career teachers; identifying gaps in teacher recruitment; and a project to recruit engineering graduates into physics teaching.
   - The SCORE position paper: Sciences at Key Stage 4, time for a rethink[38]; our response (with partners) to the Ofqual consultation on inter subject comparability[39]; and our response (with partners) to the DfE consultation on a CPD standard[40].
   - Our main support material is the Supporting Physics Teaching resource. This is an evidence informed tool to help teachers think about the way that they teach physics. Whilst we do not put the referencing within the resource, we do provide lists of typical and recommended PER resources[41].

2. How easy do you find it to identify, access and make use of educational research, and what are your main sources of educational research findings?

   We use a number of printed resources, sources and journals. Relating to the three areas in the answer to Q1, they include:

   1. Aspires, UPMAP, CEM centre, Sutton Trust, NFER, Cambridge Assessment, Gatsby (reports by Alan Smithers), Royal Society state of the nation, and the National Pupil Database (NPD), along with our own pilot projects
   2. As above.

   Published books (aimed at teachers and teacher educators), Physics Education, School Science Review, International Journal of Science Education, the Physics Teacher, American Journal of Physics, and Journal of Research in Science Teaching.

[37] http://www.iop.org/education/teacher/support/girls_physics/improving-gender-balance/page_63795.html
[38] http://www.score-education.org/media/17187/des3620_score_sciences%20at%20ks4%20final.pdf
[39] http://www.iop.org/policy/consultations/file_67267.pdf
[40] http://www.iop.org/policy/consultations/file_66632.pdf
[41] http://supportingphysicsteaching.net/SupportersCreate/DocShow/show.html?file=http://supportingphysicsteaching.net/topicEvidenceSource/EnEvidence.md

Furthermore, we commission research and reports from NPD on the choices and pathways that students follow which we use as both an external and internal tools – to report on trends and concerns, and to benchmark, report on, and inform our own work.
We also attend academic and policy conferences, both as active participants and to take away new knowledge to inform our work. We access the information directly from the conference itself or the subsequent proceedings.

3. What would be your priorities for educational research, and why?
There are significant structural and communication challenges that should be addressed in UK education research.

- Currently, the UK has only a small number of physics education researchers. This is in part due to the lack of a robust structure for developing education researchers: people often end up in subject-specific pedagogy research having followed a path through teaching, teacher training and, finally, research. Within this system there is a lot of very specific research with small datasets being produced at a subject level. This research tends to not be very generalizable and is predominantly carried out by students on a Masters course or by teachers in their classrooms. It would help the education system to have a more systematic approach to developing subject specific education researchers.

- Presently it is very difficult for teachers to progress within their subject area to higher levels of understanding they might attain through, for instance, research. While developing new teachers and those less experienced is in part expanding their pedagogical content knowledge (PCK), for more experienced teachers with a rich PCK there is little available to build upon this knowledge and take it further. To try to improve matters the IOP's Teacher Network has started enrol a small number of Physics Network Coordinators on an annual basis on a Master's course at the University of Oxford[42]. This course will hopefully allow us to move towards a specific solution providing better support for teachers who have largely mastered their professional role. Chartered status may play a part in this solution, building on the IOP Chartered Physicist qualification.

- There is a need to develop improved ways of disseminating the findings of research. In part, this is about translating the research into ideas that can be used in the classroom and putting it into a form that is digestible and meaningful to teachers. Much of the PER in journals is written for a researcher audience rather than a practitioner audience and as such language can be a significant barrier for the research to be translated. This is particularly problematic as teachers are likely the primary audience to translate this research into action.

- There are weak links within HEIs between the education researchers, the subject specialists and the teacher trainers. Often education departments and subject departments (i.e. physics departments) are completely separate entities on a campus. And, increasingly, teacher training will be carried out by a group that is separate from the education research group. This structure means that trainee teachers do not necessarily benefit from research findings, they are not exposed to the power and utility of research activity, and neither the education researchers nor the teacher trainers are linked to the disciplinary department. This final point means that new physics academics are not supporting teacher trainers and, similarly, they themselves are not being supported by pedagogic research in doing their own teaching (either general or subject-specific). In addition to this, there is also evidence of a rising trend in teaching only and scholarship contracts in subject departments[43], who are under no obligation or have no expectation placed upon them to undertake pedagogic research.

[42] http://www.education.ox.ac.uk/courses/msc-teacher-education/
[43] https://www.heacademy.ac.uk/system/files/resources/shifting_academic_careers_final.pdf

- Much of the research at school level is about whole school issues, general education questions or structural research (e.g. the influence of school uniforms, questioning techniques, three part lessons). There is very little research into subject-specific questions (e.g. 'is it better to learn about power before energy or vice versa?' or 'what is the best way to teach students about potential difference?').

4. Are there demonstrations of effective links between practitioners, policy-makers and researchers in this country, or internationally, that the Working Group should be aware of?
    - The IOP is running a number of projects to support practitioners with accessing or carrying out research. At school level we have the PIPER[44] project and at university level we are working on a project to open up funding for pedagogic research in HE (SPHERE[45]) and a project to improve conceptual understanding from undergraduate courses (ECUIP[46]).

    - We disseminate our work through our teacher network (for schools), our HE networks and through the Physics Higher Education Conference (PHEC).

[44] https://www.iop.org/education/teacher/support/piper/page_62597.html
[45] http://www.iop.org/education/higher_education/sphere/index.html
[46] http://www.iop.org/education/higher_education/conceptual/index.html

The Key

Summary of main points

- Educational research can be lengthy and detailed, making it difficult for practitioners to apply it
- Schools are often too time-poor to read long academic research reports
- We aim to summarise existing research in a clear, concise way, and make it practical for school leaders
- Our large audience of school leaders allows us to disseminate research effectively

How are you involved with schools and colleges?
The Key provides impartial, trusted leadership and management support to schools in England and Wales. Our two national information services, The Key for School Leaders and The Key for School Governors offer instant answers to questions on all aspects of school leadership and governance. We cover topics, such as raising achievement, preparing for inspection, financial management, recruitment, safeguarding, school improvement planning and more.

CPD Toolkit from The Key gives schools everything they need to run high-impact, in-school training for teachers, leaders and support staff. Each module is designed to be delivered by staff to staff to support deep learning that drives school improvement.
The Key supports more than 45% of schools in England.

What is your company's contribution to the field of education research?
The Key's annual State of Education survey collects the views of thousands of school leaders and governors across the country, and presents findings. The 2016 report addressed some big topics, such as pupil applications and places, pupils' readiness for school, and workload and morale:
State of Education Survey Report 2016
https://www.joomag.com/magazine/state-of-education-survey-report-2016/0604114001462451154

The Key for School Leaders and The Key for School Governors websites feature articles that disseminate the findings from key pieces of research for members that are time-poor. Our most popular research-based articles have been viewed by thousands of members.

The CPD Toolkit from The Key is developed with leading organisations and subject experts. Its modules cover topics ranging from providing effective feedback to pupils, to time management, and are underpinned by relevant, evidence-based research.

How do you disseminate research?
Dissemination is our main focus in terms of using research on The Key for School Leaders and The Key for School Governors.

Most of the articles we write are in response to school leaders' questions, which often ask for research on particular topics, or for the most effective ways of doing something. Our research-based articles summarise research on the effective use of teaching assistants, homework and digital technology, and more. Articles are sent directly to the member who asked the question, and are freely available on our site for our 80,000 members to see.

We also keep up to date with developments in the sector and keep track of when new research is published. Depending on the importance or scale of the research, we may write an article about it, link to it in articles on relevant topics, or send our members an email alert to let them know there is a new piece of research they may find interesting.

We regularly communicate with our members via email and over the phone. We make sure we point them towards relevant information, including education research.

Our CPD Toolkit modules includes research summaries. The toolkit also includes ‘staff digests’ which are shorter, more focused sessions, that examine the research on a particular topic and help teachers understand what to do with it.

How easy do you find it to identify, access and make use of education research?
The Teaching and Learning Toolkit from the Education Endowment Foundation is perhaps the most useful resource that we use to quickly point our members towards strategies that work. It is clear, easy to understand, accessible and only provides the most relevant information.

Subscribing to newsletters from education research organisations and following them on Twitter helps us spot when new research is published. Following the news, both national and education trade publications, is also a useful way of keeping up with new research.
However, academic education research is often hidden behind paywalls, which is very inaccessible and unaffordable for many schools. Squeezed local authorities are no longer conducting as much research and making it readily available. The language used in research reports is often very specialist and inaccessible, and it is usually theoretical rather than abstract, which makes knowing how to implement the findings quite difficult.

What are your priorities in the field of education research?
Our priority is helping school leaders access high-quality research and understand how to translate this into their school practice, so they can save time, solve problems and improve outcomes for pupils.

As many school leaders as very busy and time-poor, we clearly signpost them to what they need to know. To achieve this, we present education research concisely and in plain English.
We aim to do this through our websites and CPD toolkit. We are keen to be part of the movement towards using an evidence-based approach to underpin excellent teaching and school management.

LEARNUS

Summary

LEARNUS argues that:

- Education research is a truly multi-disciplinary endeavour and therefore mechanisms need to be explored for improving the facilitation of research that brings together the different perspectives in order to understand better the interaction between major factors involved in learning and teaching;
- In coming to understand the various dimensions of education teachers and policy-makers should be able to draw on evidence from all fields of educational research AND from disciplines that have the potential to inform education research and practice such as neuroscience and related cognitive science disciplines;
- "Translation" of research findings into policy and practice remains a major challenge for education research. Greater investment (funding, time and effort) needs to be made in order to understand the process of "translation" and how it can maximise the benefits of research for all learners, the economy and society.

1. LEARNUS is a recently established thinktank dedicated to bringing together educators and those who specialize in the study of the brain, the mind, and behaviour in order to use insights gained from high quality research to improve and enrich learning for all. The Learnus community 'shares' knowledge, research and experience through our membership which includes: teachers, neuro and cognitive scientists, psychologists policy-makers, researchers and practitioners. Learnus published its first pamphlet, *Understanding learning: engaging brains and building networks*[47], in June 2014. Further details of LEARNUS activities can be found at www.learnus.co.uk .

2. LEARNUS welcomes the opportunity to make the following submission to this inquiry into education research because it believes very strongly that our approach to education at all levels should be based on robust evidence drawn from high quality, relevant research. In particular we argue that understanding **how to learn** is every bit as important as **what to learn.** Therefore the core of our activity focusses on findings taken from the field of educational neuroscience and related cognitive science disciplines in order to help teachers develop their own understanding of how learning takes place and keep abreast of new evidence which is becoming available.

3. The focus of our work is the facilitation of dialogue between members of the different communities involved in the education of young people; these include researchers from neuroscience, psychology, education, teachers from all types of university, college and school, and other education practitioners such as educational psychologists. Importantly the feedback we have had from participants in our activities and the partners with whom we work strongly supports our approach but this is only scratching the surface.

4. Based on our experience of working at the interface between researchers and practitioners, LEARNUS wishes to draw 3 key issues to the attention of the working party for consideration:
    - The need for education research to facilitate improvements in multi-disciplinary approaches to challenges and problems;
    - The need for education research to be more open to findings from other disciplines;
    - And, perhaps most importantly, the need to invest more heavily in understanding and implementing mechanisms for "translation" of research findings into practice and policy.

[47] Available at: http://www.learnus.co.uk/learnus_brochure_a.pdf (last accessed 28/10/2016)

Improvement of multi-disciplinary approaches

5. The phrase “Education research” covers a multitude of things, each offering different perspectives on “education”. However, too often the lines of enquiry run in parallel and so, by definition, never meet. The interaction between groups of researchers from different areas of educational research is too often limited, resulting in what might be referred to as ‘research silos’. There are few opportunities for examining issues by bringing together evidence from the various fields and presenting a more holistic interpretation of the situation / topic. There are even fewer opportunities to plan and develop research programmes that are multi-disciplinary bringing together researchers from several areas of “education research”.

6. This is not to say that there are no examples of programmes that have endeavoured to take a more holistic approach to an area of education; examples include: The Teaching Learning and Research Programme (TLRP), The Targetted initiative on Science and Maths Education (TISME) and the Cambridge Primary Review (CPR). Each of these had a clear focus based on a cross-cutting theme (TLRP – teaching and learning), particular subjects (TISME - science and maths) or phase of education (CPR – primary education) and importantly a mechanism for co-ordinating the various strands of the work. Reflections on the effectiveness and impact of programmes such as these would help to inform future approaches to multi-disciplinary research in education.

7. In addition thought needs to be given to what themes such multi-disciplinary approaches might investigate in order to establish widely agreed priorities that need to be addressed. Particular attention should be given to exploring mechanisms (including funding) for improving the facilitation of research that brings together the different perspectives in order to understand better the interaction between major factors involved in learning and teaching. However, as noted below (paragraphs 11 - 13), such programmes should take account of the “translation” process for development of the research findings through to implementation in policy and practice at all levels.

Openness to findings from other disciplines

8. Just as the is a risk of “research silos” developing within the “education research” there is also the risk of “education research” itself becoming a “silo” with little or no interaction with other disciplines. In coming to understand the various dimensions of education teachers and policy-makers should be able to draw on evidence from all fields of educational research AND from disciplines that have the potential to inform education research and practice. One such area that is of particular interest is neuroscience and related cognitive science disciplines.

9. Although there is a history of links between education and psychology the advances in techniques for studying the structure and function of the brain have led to great interest in the potential of such research to influence education. Indeed the Royal Society’s own report *Brain Waves*[48] argued that:
   - Neuroscience should be used as a tool in educational policy.
   - Training and continued professional development of teachers should include a component of neuroscience relevant to educational issues, in particular, but not restricted to, Special Educational Needs.
   - Neuroscience should inform adaptive learning technology.
   - Knowledge exchange should be increased.

10. Not without risks and controversy the potential for neuroscience influencing education research, policy and practice is being explored, often under the term “Educational neuroscience” and efforts are being made to develop programmes which involve the various disciplines. For example, six

[48] See pages 19-21 in Royal Society (2011) *Brainwaves Module 2: Neuroscience: implications for education and lifelong learning.* Available at: http://royalsociety.org/policy/projects/brain-waves/education-lifelong-learning/ (last accessed 28/10/2016)

projects were funded by the Education Endowment Foundation and the Wellcome Trust in 2014[49], one of which (UnLocke[50]) involves Learnus as a partner with the Centre for Educational Neuroscience, London. While this is a step in the right direction there remains a need to encourage educational researchers to engage with researchers from other disciplines and, importantly, to consider ways in which their findings are communicated beyond the research community and, where appropriate to inform policy and practice.

"Translation" of research findings to inform policy and practice

11. "Translation" of research findings into policy and practice remains a major challenge for education research. Greater investment (funding, time and effort) needs to be made in order to understand the process of "translation" and how it can maximise the benefits of research for all learners, the economy and society.

12. The relationship between researchers and practitioners is highly variable but the perception, at least, is that overall it is somewhat tenuous. Drawing again from science education, which is considered to have some good examples of research based curriculum projects (CASE and SPACE), the way in which research evidence is (or not) used gives grounds for concern. For example Ratcliffe (2010)[51], found that "even if the evidence was extensive and suggested that adopting a particular teaching strategy could bring about improvement in learning, many [teachers] would not necessarily adopt change." and Bell (2014)[52] that, "Despite the emphasis placed on the need for robust research and good evidence to develop successful interventions, the perception is that in practice little use is made of either existing evidence or of that which is gathered during the intervention itself." In both these cases the phrase 'lost in translation' comes to mind reflecting the gap between not only the research and practice but also the communities involved.

13. Through its activities Learnus is attempting to make a contribution to bridging the gap between researchers and practitioners across several disciplines. Along with others we are trying to establish a dialogue between various groups in order to maximise the impact of what is known and to explore ways of "translating" research to better inform practice and policy at all levels. From our experience little is known about the process of "translation" of research from the initial investigations and trials through development into robust educational practices to implementation in the school and classroom. The challenges are substantial, from understanding the theoretical underpinnings of the way in which knowledge flows through education systems to the practical day-to-day issues of how to engage teachers and schools with research and its findings. However, with the increased emphasis on the impact of education research the whole process of "translation" requires greater attention from the whole education community and should be a higher priority in terms of "education research" and "practice"!

[49] For more details see: https://educationendowmentfoundation.org.uk/news/eef-in-the-news-new-neuroscience-projects/ (last accessed 28/10/2016)
[50] Further details available at www.unlocke.org (last accessed 28/10/2016)
[51] Ratcliffe, M. (2010). How science teachers use research evidence. [Summary]. Better: Evidencebased Education, 2(3 Spring 2010), 2.
[52] Bell, D, (2014) The perceived success of interventions in science education. A report for the Wellcome Trust. Available at: https://wellcome.ac.uk/sites/default/files/wtp056459_0.pdf (last accessed 28/10/2016)

Loughborough University - Mathematics Education Centre

Summary

Loughborough University's education research activity in recent years has had a clear strategic focus on the teaching and learning of mathematics. The structure at Loughborough is unusual: education research is conducted by the Mathematics Education Centre (MEC), a unit within the School of Science that works closely with the Department of Mathematical Sciences. We believe that this focused approach, together with close collaborations with disciplinary experts, has been highly productive.

Mathematics education research has made significant contributions to teaching and learning through better understanding of basic learning processes across a broad range of topics, including preschool number skills, mathematics learning difficulties, conceptual understanding and mathematics anxiety. Programmes of research in the UK and elsewhere have revealed the cognitive skills important for success with mathematics, developed screening measures to identify individuals in need of extra support and identified interventions to improve student outcomes. These contributions have come about through basic research, which is often laboratory-based, that focuses on fundamental questions about how people learn. However, we are concerned that there is a dearth of funding sources for this type of blue skies research in the current funding landscape, which puts at risk education researchers' capacity to make significant future contributions to policy and practice.

Effective bi-directional links between educational researchers and practitioners have been established both by researchers and teacher organisations which allow educational research findings to feed into classroom practice. In contrast, effective links between educational researchers and policy makers are less well established, limiting the ability of policy-makers to make evidence-based decisions.

Describe the contribution your field has made to educational research, policy, teaching and learning, and society?
We believe that positive changes to educational policy and practice are best guaranteed though the application of sustained programmes of meticulous, scientific research into the fundamental processes of learning. In this way, contributions have been made across a broad range of topics related to the learning of mathematics.

Mathematical Learning Difficulties (Dyscalculia): Up to an estimated 6% of individuals have significant and sustained difficulties learning mathematics that results in poor achievement, negative emotions towards mathematics and low levels of numeracy, with negative consequences on an individual's life chances. Basic mathematical cognition research from the UK, Europe and North America has identified that these difficulties often stem from numerical representation and processing deficits. Experimental studies exploring the nature of basic numerical representations (e.g. the Approximate Number System or the "mental number line") have identified that individuals with dyscalculia have problems representing magnitude information and accessing this from number symbols. This basic research has led to the development of screening tools to identify individuals with dyscalculia. Accurate identification of individuals with mathematical learning difficulties is crucial to allow teachers to intervene early, consequently reducing the longer-term difficulties that individuals may face.

Early numerical skills: Children begin to learn basic number concepts and mathematics skills from an early age, well before they begin formal mathematics instruction. Significant programmes of research, largely conducted in the USA, have explored the basic skills that form the bedrock to later success in mathematics. This research has involved large-scale longitudinal studies that follow cohorts of children from the pre-school period through into formal mathematics education and beyond. These studies, which involved detailed cognitive assessments, have identified the early skills that predict later success. In particular, pre-school measures of 'number sense', which includes basic skills such as counting, digit

recognition, and quantity comparison, is a strong predictor of later mathematics achievement. The identification of these basic skills highlights the areas that successful interventions should seek to target in order to improve young children's early numerical skills and to ensure that preschool children are prepared for formal schooling.

Domain-general skills and mathematics: Recently there has been increasing awareness of the importance of domain-general skills for mathematics performance. In particular, executive functions, the set of skills that guide and control our thoughts and behaviours have been identified as being crucial for success in learning and performing mathematics. These skills include working memory, the ability to hold and manipulate information in mind, inhibition, the ability to ignore irrelevant information and unwanted responses, and shifting, the ability to switch attention between different tasks. Basic cognitive research conducted in the UK, Europe and North America have identified that these skills play an important role in all academic areas, but most notably in mathematics. This work has highlighted that some children's struggles with mathematics may arise not from domain-specific difficulties, but from weaknesses in these general thinking skills. This basic cognitive research has led to attempts to improve mathematics achievement through focused training of executive function skills (e.g. working memory).

Understanding the equal sign: For many years researchers in the US have explored how children read and interpret arithmetic equations. This work has been driven by a theoretical account of how and why children's difficulties with understanding mathematical equivalence arise and become entrenched, along with evidence for the importance of ensuring children acquire a solid understanding of equivalence in order to succeed with algebra and other secondary school and university topics in mathematics. A key outcome of this programme of research has been a detailed understanding of how minor tweaks to teaching and learning, such as the formatting of arithmetic exercises in textbooks, can improve students' understanding of equivalence as well as their arithmetic fluency. Building on this large body of robust, replicable evidence, researchers are now developing and testing interventions. Hundreds of teachers and dozens of schools in the US are now applying these findings in the classroom. Moreover, researchers in other countries are now refining and applying the theoretical findings in order to conduct further research and design interventions appropriate to their own national contexts.

Mathematics anxiety: Many children and adults have negative emotions towards mathematics, which interferes with mathematics performance and leads to the avoidance of mathematical activities. Research into mathematics anxiety has a long history, but recent developments have included the development of new measures for use with young children and the adoption of experimental approaches to explore the mechanisms that account for the association between anxiety and poor mathematics achievement. These studies have highlighted that mathematics anxiety is observable from the early stages of formal mathematics instruction, and increases with age, that it effects both basic number processing as well as higher-level mathematics, and that the relationship between gender and mathematics anxiety is not straightforward. These findings, have led to the development of promising interventions to help individuals with anxiety, focusing on the cognitive mechanisms involved.

In each of these areas, the developments for education have come about through basic research, which is often laboratory-based, and focused on understanding the basic mechanisms of learning and performance. Successful interventions were developed not from studies comparing the effectiveness of different interventions, but from sustained, fundamental research into children's learning processes.

In the past 10 years, what would you judge as the most significant contributions your field has made?
As noted above, the last 10 years have seen significant contributions in awareness of the prevalence of mathematical learning disorders, understanding of the mechanisms underlying these difficulties and in developing screening measures and interventions to support children with these difficulties. An excellent collection of significant contributions made by education researchers can be found in the US-based Institute of Education Sciences' report 'Synthesis of IES-Funded Research on Mathematics 2002-

2013'.[53] The report details 24 significant contributions that recent education research projects have made to improving mathematics learning.

What particular barriers and challenges do you face in undertaking educational research, and what changes might help overcome these? Please say whether these barriers and/or challenges apply to 'blue skies' or 'applied' research.
We are concerned that the current research funding landscape may be detrimental to educational research quality, especially with respect to basic research on fundamental processes of learning. The main funder of blue skies education research is RCUK, which distributes funding through the Economic and Social Research Council (although, of course, the ESRC also funds applied research and partly assess grant applications on their potential to create direct impact).

Since 2010 the ESRC has awarded 11 education research grants from 194 applications, a success rate of 5.7%.[54] In REF2014 1328 education researchers were returned, meaning that at any given point well under 1% of active education researchers hold RCUK funding.

This extremely low success rate is a serious concern, as non-RCUK education research funders typically focus on highly applicable research. For instance, the Educational Endowment Foundation (EEF) only funds randomised controlled trials of existing interventions, and the Nuffield Foundation prioritises research that aims to influence policy and practice. We believe that it is important that these applied funding sources exist, but that it is damaging to the research ecosystem if they are not complemented by sources of funding that encourage the type of basic research discussed above. Clearly, interventions need to be developed before they are trialled, and it is scientific research that focuses on fundamental learning processes that leads to insights that can be developed into promising interventions for future testing.

In sum, we believe that it is important that the UK education research community does not lose its capacity to conduct blue skies education research that focuses on fundamental questions about how people learn. It is therefore important that it is possible to obtain funding to conduct such work. We would strongly encourage the Working Group to consider how high quality basic research on learning could be facilitated through, for example, targeted funding calls from the British Academy, Royal Society or ESRC.

We further believe that the ESRC should be asked about the substantial differences in success rates between disciplines. For instance, while 11 education grants of 194 applications have been funded since 2010, the equivalent figure for psychology grants is 141 from 720, a success rate nearly four times higher (19.6%). While this might be understandable if the quality of UK psychology research were dramatically greater than that of UK education research, REF2014 gives little reason to suppose that this is the case. Indeed, the proportion of research activity rated 4* by the Education Subpanel (30%) was the highest of any within Main Panel C, and was comparable to the equivalent figure from the Psychology Subpanel of Main Panel A (37%).

Are there demonstrations of effective links between educational researchers, policy-makers and practitioners in this country, or internationally, that the Working Group should be aware of?
Effective links between educational researchers and practitioners can be challenging to establish. However, there are examples of successful attempts to do so, which have resulted in bi-directional dialogue between researchers and educators. ResearchED is an organisation which aims to improve teachers' research literacy by providing a website of resources and organising events to bring together teachers and educators to discuss different educational approaches and the evidence for their effectiveness. This organisation is notable for being teacher-led and because it fosters a collaborative approach of teachers and researchers working together. We also would point to the US-based 'Deans for

[53] https://ies.ed.gov/ncer/pubs/20162003/
[54] These figures are from academic years 2010/11 to 2014/15 inclusive. Source: ESRC Vital Statistics.

Impact' group, an organisation that brings together the Deans of leading Schools of Education in the US. Their *Science of Learning* report is an excellent example of how high-quality basic research on student learning can be communicated to teachers in a way that has direct implications for classroom practice.[55]

While effective links between researchers and practitioners have been established, in contrast, effective links between researchers and policy-makers seem to be considerably harder to develop. Researchers often find barriers to developing lines of communication to policy-makers, either directly or through intermediary organisations. These barriers contribute to a widely-held belief among researchers that educational research fails to achieve its potential impact to improve education in the UK because of the difficulty in establishing effective links with policy makers. This results in policy decisions that are not based on evidence.

What are the priorities in your field of educational research, and what is driving these?
In 2014 we ran a Royal Society-funded international conference to identify the grand challenges facing mathematics cognition (a sub-discipline of mathematics education). This conference brought together leading international researchers to discuss the priorities for the field and collaboratively determine a set of questions with the potential to significantly advance understanding of mathematics education. The resulting list comprised 26 questions divided into six broad topic areas: elucidating the nature of mathematical thinking, mapping predictors and processes of competence development, charting developmental trajectories and their interactions, fostering conceptual understanding and procedural skill, designing effective interventions, and developing valid and reliable measures.

Alcock, L., Ansari, D., Batchelor, S., Bisson, M.-J., De Smedt, B., Gilmore, C., Göbel, S. M., Hannula-Sormunen, M., Hodgen, J., Inglis, M., Jones, I., Mazzocco, M., McNeil, N., Schneider, M., Simms, V., & Weber, K. (2016). Challenges in mathematical cognition: A collaboratively-derived research agenda. *Journal of Numerical Cognition, 2,* 20-41.

What grouping best describes your institution (eg Million + Group, University Alliance, Russell Group, etc.)?
Loughborough University is a research-intensive HEI and was, until its disbanding, a member of the 1994 Group.

How do you support educational research in your institution? How has the level of this support changed over the past 10 years (e.g. particular investments in staffing and training and development), and why?
Education research at Loughborough has a tight strategic focus on mathematics education. Research activity is situated within the Mathematics Education Centre (MEC), a department within the School of Science. Unusually for education research groups, the MEC has close collaborative links with the Department for Mathematical Sciences (for instance, the undergraduate teaching of mathematics and statistics is shared between both departments). The MEC was set up in 2002, and its research capacity and quality has expanded significantly over the last ten years: in REF2014 85% of the MEC's research was rated as world leading or internationally excellent (ranked 5th), compared to 20% (63rd) in RAE2008. This substantial increase in capacity and quality was the result of targeted investment in promising early career staff and, in particular, the award of three Royal Society Research Fellowships (two Education Research Fellowships, one Dorothy Hodgkin Research Fellowship), one British Academy Postdoctoral Fellowship, and one ESRC Future Research Leaders Fellowship.

We believe that the MEC's progress over the last ten years demonstrates that our approach of focusing on discipline-specific education research, together with strong collaborations with disciplinary specialists, represents a successful model. If the Working Group were interested, we would be happy to provide further information about the organisational structure of education research at Loughborough.

[55] http://deansforimpact.org/the_science_of_learning.html

Have you observed that educational research is becoming more interdisciplinary (please provide details) and, if so, how are you accommodating this?
We believe that there is a great opportunity for education research to be enriched by insights from neighbouring disciplines. The MEC at Loughborough has reacted to this potential by grouping – within the same department – researchers with backgrounds in mathematics education, cognitive psychology, developmental psychology, mathematics, and neuroscience. This mix of expertise is a key strength of the department.

During the next 3 years, do you expect to invest more or less in supporting educational research? Why is this so?
Loughborough University's strategic plan commits us to building on our strengths and investing in areas that produce internationally excellent research and a high quality student experience. The Mathematics Education Centre is such an area, and we intend to support the unit's ambitions through further strategic investment in staffing and research facilities.

Mathematics, Science and Health Education Research Centre

1. What broad area of educational research do you work in, and what is your role?
   We work in the area of research on mathematics, science and health education. As a research centre at University of Southampton, our role is to develop methods and theories that are world-leading.

2. The contribution your field has made to educational research, policy, teaching and learning, and society?
   In developing methods and theories, our contributions in mathematics, science and health education inform the STEM (science, technology, engineering and mathematics) agenda, at a UK national level and internationally. Examples of our contributions include conceptual development in mathematics and science education, the design of textbooks and teaching resources, education for biodiversity, sustainability and citizenship, and education interventions such as Lifelab.

3. In the past 10 years, what would you judge as the most significant contributions your field has made?
   Significant contributions include research on conceptual development in mathematics and science, education for biodiversity and sustainability, the embedding of ICT in teaching and learning, health education, professional learning of mathematics and science teachers, the teaching and learning of mathematical and scientific reasoning, the design and use of teaching resources, and the analysis of large data sets.

4. What are the priorities in your field of educational research, and what is driving these?
   - Priorities encompass equity for all learners, and new visions for student achievement and for the professional development of mathematics and science educators.
   - Robust evaluation of 'what works', the need for greater capacity in the research field, and the need to build cross-disciplinary work with psychology, computer science, sociology, economics, neuroscience and other fields.
   - Key drivers are the need for equity for all learners and effective (and efficient) use of teaching time and teaching resources.

5. Barriers and challenges in undertaking educational research, and what might help overcome these?
   - Shifting funding patterns and government policy initiatives are tending to exacerbate uncertainty leading to fragmentation and threats to capacity building. Greater recognition of the benefits of investing in research, and greater attention to growing the evidence-base for policy and practice would help.

6. Opportunities to deepen the contribution that your research field makes?
   - Our attention to research dissemination and impact is helping. This includes our use of social media to foster more nuanced appreciation of our research that goes beyond ‘sound-bites’.
   - More secure funding mechanisms would help, especially for impact-related work, as would more time/incentives for teachers to further their use of the research evidence-base.

7. How do you disseminate your research?
   We pay great attention to research dissemination and impact to education professionals and policy makers through our work with teachers and through articles and books, presentations and seminars, through our blog (https://blog.soton.ac.uk/mshe/), social media (eg Facebook and Twitter @MSHEsoton), and our University of Southampton Mathematics and Science Learning Centre (MSLC; http://www.southampton.ac.uk/mslc/index.page).

8. Effective links between educational researchers, policy-makers and practitioners?
   We actively participate in various channels that bring together researchers, practitioners and policy-makers (including our own initiatives and work with organisations like the ASE, BSRLM, NCETM and the Maths Hubs, and Computing At School). When opportunities arise, we actively take roles in policy-making advisory groups such as the DfE's national working group on 'planning and resources'.

National Audit Office

Summary of main points

- Our role is to scrutinise public spending for Parliament. Our public audit perspective helps Parliament hold government to account and improve public services. Our work includes reporting to Parliament on whether departments and the bodies they fund have used their resources efficiently, effectively, and with economy. We provide the House of Commons Committee of Public Accounts with a range of value for money reports, as well as briefings and analysis, to support its inquiries into public spending.

- Under the National Audit Act 1983, the NAO can examine and report on the economy, efficiency and effectiveness with which departments and other bodies have used their resources. We are not allowed to question the merits of policy objectives. We have statutory rights of access to relevant documents and information from the bodies we audit.

- Research informs our audit findings, conclusions and recommendations in a number of ways. Examples of topics we have reported on in 2016 include children in need of help or protection, the apprenticeships programme, entitlement to free early education and childcare, and training new teachers.

- In our work we have identified areas where the Department for Education would benefit from additional information for monitoring progress, to evaluate the implementation of policy and for accountability purposes. We have set out examples of these which point to areas where additional research would be useful.

- In auditing the Department for Education we are focusing on several strategic issues facing government: improving outcomes from a diverse range of providers; effective oversight and intervention; and providing users with accessible and integrated services.

What broad area of educational research do you work in, and what is your role?
Our role is to scrutinise public spending for Parliament. Our public audit perspective helps Parliament hold government to account and improve public services. We do this by fulfilling our statutory roles in financial audit and value for money reporting across central government and local bodies.

Our value for money work looks at how government departments and other public bodies have used their resources and considers whether value for money has been achieved. We define value for money as the optimal use of resources to achieve the intended outcomes, while acknowledging expressed or implied constraints. Our role is not to question the merits of government policy objectives, but to provide independent and rigorous analysis to Parliament on how public money has been spent to achieve those policy objectives. The recommendations from our work result in financial savings and positive changes to improve services for users and value for money for the taxpayer.

My role is the Director responsible for our value for money work examining the Department for Education and associated central government bodies.

How do you disseminate your research?
Our main mechanism is to report to Parliament on whether departments and the bodies they fund have used their resources efficiently, effectively, and with economy. We provide the House of Commons Committee of Public Accounts with a range of value for money reports, as well as briefings and analysis, to support its inquiries into public spending.

As well as evaluative value for money reports, our work includes investigations (such as into the government's funding of Kids Company and the Education Funding Agency's oversight of related party transactions at Durand Academy), reports on good practice and support to other select committees including the House of Commons Education Committee (for example for their inquiry into the supply of teachers). We also engage with stakeholders in the sector about the results of our work and speak at conferences.

How do educational research findings inform your work?
The starting point for our value for money studies are the objectives of government and how those objectives are to be achieved. We typically frame our research with a study question and evaluative criteria. The methodology for each of our studies will involve a range of data and research to answer the study questions and assess policy implementation against the evaluative criteria. These data and research may include information from the department or other government bodies, evidence from third party organisations, or our own research and analysis. We combine evidence from a range of methods to reach our conclusions and recommendations. Where possible we will assess the robustness of the research undertaken.

Typically, a study will use a mix of quantitative and qualitative methods. The methods we commonly use include:

- Financial analysis
- Analysis of management information
- Document review
- Interviews
- Focus groups
- Literature review
- Surveys of practitioners or service users
- Benchmarking with other organisations or other countries
- Consultation with stakeholders
- Statistical analysis

Our staff must act in line with the values of the NAO (to be independent, authoritative, collaborative and fair). We carry out our value for money work in line with standards that represent the NAO's expectations for how staff should carry out this work. We use staff with a range of professional expertise and bring in specialists from outside the organisation when required.

Our work on education and skills can be found on our website. Each of our reports sets out our audit approach and evidence base in the appendices. Recent examples of value for money reports examining the work of the Department for Education are as follows:

- Children in need of help or protection (October 2016) examined the Department's progress in improving the system to help and protect children. We looked at the system from the point where someone contacts a local authority with concerns about a child to the point where the authority makes a child the subject of a child protection plan.

- Delivering value through the apprenticeships programme (September 2016) examined whether the Department could demonstrate that the increasingly employer-led apprenticeships programme is achieving value for money.

- Entitlement to free early education and childcare (March 2016) examined whether the Department is getting value for money from its expanding entitlement to free early education and childcare.

- Training new teachers (February 2016) examined whether the Department is achieving value for money through its arrangements to train new teachers.

How easy do you find it to identify, access and make use of educational research, and what are your main sources of educational research findings?
Under the National Audit Act 1983, the NAO can examine and report on the economy, efficiency and effectiveness of public spending. We have statutory rights of access to relevant documents and information held by the bodies we audit. This enables us to draw on a wide range of research and data to inform our work.

We typically also make use of research from a range of other sources and we reference the published sources in our reports. Where research is not available to inform policy implementation, for example evaluation, we may make a recommendation to the Department to undertake or commission work where we conclude it is significant in ensuring value for money or to enable Parliament to hold the Department to account.

What would be your priorities for educational research, and why?
We have answered this question in two ways: priorities for educational research based on the findings from our work; and priorities for our education work based on the strategic issues facing government and our planned work programme.

Findings from our work

In recent value for money reports we have recommended areas which would benefit from more information, which may require additional research.

In *Children in need of help or protection* we recommended that the Department should*:*

- Develop its intervention regime so that it uses lead indicators, such as re-referral rates, repeat child protection plans and social worker vacancy and agency staff rates, to anticipate and act on failing services before they fail.

- Develop better indicators to monitor the lives and outcomes for children and families who are, or have been, in contact with the child protection system, and hold local authorities to account for their performance.

- Build on its work to improve cost information on services, particularly local authorities' financial returns so that cost-effectiveness can underpin decisions on practice.

In *Delivering value through the apprenticeships programme* we recommended that the Department should:

- **Set out the planned overall impact on productivity and growth, along with short-term key performance indicators to measure the programme's success.** DfE and the former Department for Business, Innovation & Skills have gained access to good data, and commissioned some valuable research. But beyond the target of 3 million new apprenticeship starts by 2020 it is not clear what constitutes 'success' for the programme.

- **Do more to understand how employers, training providers and assessment bodies may respond to ongoing reforms, and develop robust ways of reacting quickly should instances of market abuse emerge.** So far, behavioural research has focused largely on the

risk of low take-up. But there are other key risks arising from the market changes that need to be managed.

In *Entitlement to free early education and childcare* our recommendations included the following:

The Department has committed to reviewing the funding formula for early years. As it does so, it should make sure that it understands the demand for free childcare around the country and the true cost of providing it. It should use this information to set a long-term funding formula that distributes early years funding fairly.

In implementing the new entitlement to free childcare, the Department should make full use of its pilots from September 2016 to:

- Test assumptions about parental demand and estimate the number of new places needed.
- Clarify what it wants to achieve from expanding the entitlement and develop measures to evaluate effectiveness, in particular, any expected future link to increased parental employment.
- Evaluate the impact of the new entitlement on take-up of free childcare for disadvantaged 2-year-olds.
- Understand how the most effective local authorities manage and develop their early years market and share this good practice.
- Test ways of tracking the progress of individual children from childcare through to primary education.

In *Training new teachers* we recommended:

The Department should demonstrate how, through new training routes and the incentives it offers, it is improving recruitment and retention of new teachers and the quality of teaching, and at what cost. It should:

- continue working with the sector to link training data with data on the quality of teaching in the classroom, where possible using existing information;
- examine the costs and benefits of different training routes over time; and
- do the extra quantitative and qualitative work needed to conclude whether bursaries work, incorporating the results into decision-making.

The Department and the Agency should work with school leaders to:

- develop a good understanding of local demand for and supply of teachers. It should then consider how it can use modelling, the allocation process and other interventions to resolve any difficulties; and
- establish the model's accuracy by comparing its outputs with data on actual levels of demand, recruitment and vacancies in schools.

Priorities for our education work

In our work programme we are focusing on several strategic issues facing government including: improving outcomes from a diverse range of providers; effective oversight and intervention; and providing users with accessible and integrated services.

We have a number of pieces of work in progress and further information is available on our website see link:

- **Financial sustainability of schools:** Schools are facing a range of pressures on their budgets. The Department aims to support schools to manage their budgets effectively and ensure their financial sustainability, while maintaining or improving pupil outcomes. This study is examining

whether the Department is well placed to support schools to manage the risks to financial sustainability that will arise from future pressures on their budgets.

- **Capital funding for schools:** The Department for Education will invest £23 billion in school buildings over the period from 2016-17 to 2020-21. Its aims are to make sure that there are sufficient school places to meet growing demand, to address the maintenance needs of the school estate, and to support the Department's wider reform agenda, in particular by delivering buildings for the expanding free schools programme. This study is examining the Department's performance in achieving its goals.

NFER

Summary of main points

- The priorities for educational research should overlap with the priorities of policymakers and practitioners more closely than they do currently, requiring a closer and more dynamic relationship between them.
- There is an increasing demand for quantitative research and analysis, which can provide robust evidence of 'what works' in education, to help inform decisions about both policy and practice.
- If evidence is to play a more prominent role in informing education practice it is crucial that researchers and commissioners of research produce evidence that is more relevant, engaging and useful to schools' needs.
- The challenges facing organisations that undertake education research include reduced levels of funding, and a shortage of quantitatively-skilled social science graduates.
- It is important that the production and use of research evidence in education is not assumed to be a simple linear process of supply (i.e. by HEIs and other research organisations) and demand (i.e. by schools and policy-makers).
- Researchers, policy-makers and practitioners all have a role to play in building a more evidence-informed education system.

Questions for Researchers

1. What broad area of educational research do you work in, and what is your role?

Established 70 years ago, NFER is a leading, independent provider of robust and innovative research, assessments and related services for education. As a charity, impact is at the heart of everything we do. We draw on evidence to provide insights into education, from early years to higher education, to help improve education for all children and young people. We aim to make our insights relevant and accessible, informing both policy and practice across the world. Our activities fall into three main areas: research, assessment, and products and services.

Research
We undertake research and analysis for a range of clients (in particular, Government Departments and other public sector organisations) and have our own internally-funded research programme. Our different specialist teams have well-recognised expertise in a wide range of research methodologies, statistical techniques, international comparisons, and economic analyses. Our 200 staff include experts with in-depth knowledge of key education topics including; literacy, numeracy and science learning, early years, addressing disadvantage, 14-19 education and transitions, the school workforce, and science, technology, engineering and mathematics (STEM) education.

Assessment
We develop, trial and deliver assessments to the highest technical and educational standards, both nationally and internationally. Our assessment researchers are highly experienced at writing test questions across a wide range of ages and subjects. Their work has included developing optional tests for schools; National Curriculum Tests and Professional Skills Tests for teachers in England; Optional Skills Assessment Materials and the National Reading and Numeracy Tests for Wales (for Years 2-9); item-writing for the Australian Curriculum, Assessment and Reporting Authority (ACARA)'s national tests; and developing the National Reference Test on behalf of Ofqual.

Products and services
NFER's research expertise has informed the design and development of our growing range of products and services for primary and secondary schools. This includes NFER Tests, PISA Based

Tests For Schools, an Analysis and Marking Service, school surveys, and our Research in Schools programme of support.

2. Describe the contribution your field has made to educational research, policy, teaching and learning, and society?

   And

3. In the past 10 years, what would you judge as the most significant contributions your field has made?

   The field of education research has developed extensively in the past ten years and a number of substantial contributions have been made to education policy, and practice. In many cases this has been underpinned by developments in methods and the availability of data which has opened up significant new areas of investigation. Listed below are nine of the most influential contributions.

   The analysis of pupil performance, barriers and groups at risk: The availability of comprehensive datasets have enabled researchers to explore the outcomes for different types of pupils and schools. This has helped policy-makers (and practitioners) to identify where – and why – there are gaps in attainment between different groups. Much of this research has enabled a better understanding of the risks facing disengaged and disadvantaged young people such as those from low-income households or at risk of becoming not in education, employment or training (NEET). Research has also helped identify and evaluate the best strategies to assist them, with an ongoing policy focus on social mobility, the attainment gap, children on Free School Meals (FSM) and the Pupil Premium.

   The importance of early years education: Since the 1990s early childhood education in England has changed dramatically. What happens to children between birth and and five years old is now an important phase of education in its own right and one with long term implications for children as learners (Taggart *et al.,* 2015). The Effective Pre-school, Primary and Secondary Education initiative (EPPSE) was ground-breaking in the insights it provided about the importance of the early years phase and the effects it has on longer term attainment. Funded by DfE between 1997 and 2014, it influenced policies such as Sure Start and the provision of free child care.

   The development of assessment science: The availability of reliable assessment measures is a key part of effective teaching and learning. There have been major developments in research to understand how to develop robust and reliable assessments over recent decades, alongside a greater government focus on assessment. A recent initiative is the introduction of the National Reference Test (NRT) in February and March 2017, which will provide additional information to support the awarding of GCSEs (NFER, 2015). NFER is the delivery partner of the Office of Qualifications and Examinations (Ofqual) for the NRT.

   The importance of international comparisons: Given the increasingly globalised world economy, participation in international comparison studies, such as The Programme for International Student Assessment (PISA), The Progress in International Reading Literacy Study (PIRLS) and The Trends in International Mathematics and Science Study (TIMSS), is central to informing the ongoing review and improvement of education systems around the world, including those of England, Wales, Scotland and Northern Ireland. With a track-record in this area over many decades, NFER know that the results of such studies need to be interpreted appropriately, but also that they can help to identify valuable lessons from high-performing jurisdictions.

   The transition from education to employment: Research on how to best help young people transition from education to employment has been conducted on a broad range of topics such as: careers education and guidance; NEET prevention; re-engagement strategies; work experience; widening access; participation in education and training; work readiness; and the quality of vocational, applied and academic qualifications.

Teacher recruitment and retention: Rising pupil numbers, shortfalls in the quantity of new trainees, and concerns over the proportion of teachers who say they are considering leaving the profession have all put teacher recruitment and retention towards the very top of the policy agenda in education. Independent research organisations like NFER have a major role to play in rigorously analysing the messages from different data sources, and in providing new actionable insights to support the whole education sector in forming an appropriate response.

The long-term outcomes of education: There have been a number of influential studies exploring the economic returns to education, helping to reinforce the importance of education for individuals (in terms of employment and other outcomes) and for the country (in terms of economic growth, productivity and competitiveness). Research such as the Wolf Report (2011), and more recently Remaking Tertiary Education (Wolf, 2016), has explored the returns to different kinds of qualifications and routes, leading to ongoing reforms of the Further Education, Higher Education and qualification systems.

Increasing the quality and quantity of education research: The rigour of education research is improving, in particular due to longitudinal research studies such as the birth-cohort studies - that collect valuable information on education and employment, family and parenting, physical and mental health, and social attitudes - and the availability of the National Pupil Database. One of the more recent responses to concerns about the quality of UK educational research (e.g. Tooley with Darby, 1998 and Goldacre, 2013) has been the move towards more large-scale evaluations that take the form of randomised controlled trials (RCTs). The use of RCTs in education has been heavily promoted by the Education Endowment Foundation (EEF). A number of new methodological issues have arisen as more RCTs have been conducted in education, which are gradually being tackled by EEF and the research organisations that it works with, including NFER, through our dedicated Education Trials Unit.

Knowledge mobilisation and evidence-informed policy and practice: A 2013 report for the Alliance for Useful Evidence (Sharples, 2013) concluded that if the education sector was serious about developing evidence-informed practice, as much effort and resources needed to be placed on *how* evidence was applied as on *what* the evidence says[56]. In response to these challenges, NFER and other organisations are playing a leading role in the field of knowledge mobilisation within education. There has also been growing government interest in the use of research evidence to inform decisions about policy and practice. This has led to the creation of seven independent 'What Works Centres', including the EEF. However, compared with other sectors such as healthcare, this process is in its infancy and there remain debates about its ultimate destination.

4. What are the priorities in your field of educational research, and what is driving these?

Research in the fields of both education policy and practice have been partly driven by recent Government policies and reforms. Earlier this year the Government published its strategy for a world class education and care system and identified a policy focus on: teacher recruitment, development and retention; school and system leadership; school improvement; accountability; standards, curriculum and assessment; fair access; funding; 16-19 skills; early years; children's social care and protecting vulnerable children; and character education (DfE, 2016).

The move towards a more devolved and decentralised education system has resulted in increasing academisation, the emergence of Regional Schools Commissioners (RSCs), and a greater emphasis on school-to-school support and school self-improvement. These major reforms all require extensive research to evaluate their impact and to understand what works best in ensuring effective practices.

Evidence from international studies suggests that improving performance in core subject areas must remain a priority for research. England's mathematics, reading and science performance in the PISA

[56] NFER staff are currently co-editing a special issue of the Educational Research Journal with Professor Carol Campbell of University of Ontario, Canada on the topic of evidence-informed practice in education. The special issue will be published in 2017.

surveys has remained relatively consistent over recent cycles (i.e. 2006, 2009, and 2012), while other countries have made significant gains. It will be important to monitor whether this continues and to explore what can be learned from those participating countries that now outperform the UK.

There is growing demand for quantitative research and analysis to provide robust and convincing evidence of 'what works' in education, to inform both policy and practice. As in other sectors, the growing volume, variety and velocity of digital and administrative data within education offers potential for new statistical analyses, technology applications and data science techniques, to understand trends, test solutions and identify savings. The range of data sources now available include: the NPD; the School Workforce Census; Edubase; Absence and Exclusions statistics; Pupil projections; School capacity; and the Initial Teacher Training (ITT) Census. Analysis of secondary data of this nature minimises the burden on already over-burdened schools by re-using and linking existing data. For example, the Government has recently linked together a number of these datasets, making it possible to track pupils through education and into employment, creating new possibilities for research in future (DfE, 2016). Managing concerns about privacy, whilst recognising the potential value of research involving such linked datasets, will continue to be a key issue.

If evidence is to better inform education practice it is crucial that researchers and commissioners of research produce evidence that is more relevant, engaging and useful to schools' needs. There are a range of organisations that provide important 'evidence intermediary' services in helping schools to navigate and use research, by collating and synthesising existing research evidence in response to particular needs and enquiries posed by schools. However, more needs to be done to ensure that research is relevant to informing education in practice, with the new Chartered College of Teaching, and The Foundation for Leadership in Education, potentially promising developments which could play a valuable role in alerting researchers and commissioners to the key questions schools are asking.

5. What particular barriers and challenges do you face in undertaking educational research, and what changes might help overcome these? Please say whether these barriers and/or challenges apply to 'blue skies' or 'applied' research.

   The majority of our work involves undertaking 'applied' research in education, both for practitioners and policy-makers. We discuss below the three main challenges that we face in undertaking such research.

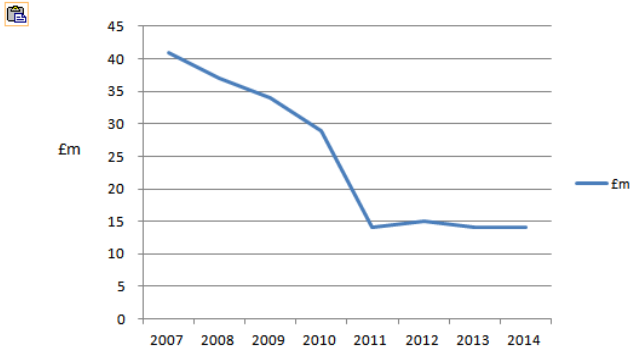
   Funding

   There are a number of major challenges associated with funding. The latest data from the Office for National Statistics (ONS, 2016) shows a decrease in Research Council funding in 2014 for science, engineering and technology (SET), which includes educational research, compared with the year before. Similarly, the budget for research and development within DfE and its predecessor departments has fallen sharply in recent years, as illustrated below.

   DfE spending on R&D

Constant prices (2014)								£ million
	2007	2008	2009	2010	2011	2012	2013	2014
Education (DfE)[6]	41 †	37	34	29	14	15	14	14
Education and Skills (DfES)[6]	-	-	-	-	-	-	-	-

From June 2007 DfES was renamed Department for Children, Schools and Families (DCSF). From May 2010 DCSF was replaced with Department for Education (DfE). In 2011, expenditure fell due to a move to drive down spend across all budgets, and reflects Ministerial priorities.



Office for National Statistics

Budgets for educational research are becoming smaller and more piecemeal; with a range of funders providing different 'pots' of resource, often with different limitations. This inhibits opportunities for longitudinal studies and larger scale, multi-method designs which can produce more robust findings.

The Education Endowment Foundation (EEF) is an exception, providing a large source of funding to strengthen the evidence base on classroom practice. . However, their focus is on assessing the impact of teaching and learning interventions, rather than the evaluation of policies. Some funders' requirements also prohibit non-HEI research organisations from applying for funding, limiting the scope for engaging other robust, innovative research organisations.

Supply of suitable researchers

There is also a growing shortage of suitably qualified researchers within education, and within the social sciences more broadly, who have sufficiently high-level quantitative and data science skills. This limits the research community's capacity to design and deliver quantitative research and analyses, or to properly interrogate the available data. This is an issue that (Nuffield Foundation *et al*., 2016), among others, are seeking to address by funding 'Q-step', a programme of specialist quantitative research skills courses for undergraduates.

New 'users' of evidence

Recent reforms have taken England towards a more autonomous, self-improving and school-led system. In light of this, school leaders and 'system leaders' are increasingly important agents in enabling a more evidence-informed system, as well as being potential commissioners and users of research. Yet, while evidence-informed decision-making is increasingly regarded as instrumental to education reforms, teaching cannot yet be regarded as an evidence-informed profession.

Within a more diverse system, there will continue to be a need for the DfE (or other appropriate national bodies) to retain responsibility and oversight for funding system-wide, long term and future-focused research.

6. What opportunities (including opportunities for dissemination) exist to deepen the contribution that your research field makes to policy, teaching and learning, and society?

Opportunities to deepen the contribution of social research to policy, teaching and learning, and society as a whole are possible through a focus on understanding and deploying effective knowledge mobilisation strategies. It is important that evidence in education is not assumed to be a linear process of supply and demand. Rather, it needs to be understood as a complex social 'ecosystem' of knowledge mobilisation, in which research is produced, synthesised, distributed, transformed and implemented by different actors (Sharples, 2013).

More research is needed to understand the relative effectiveness of these different strategies in education, as well as what others exist. However, the existing evidence suggests that dissemination may be the least effective strategy and that knowledge is more effectively mobilised through more interactive mechanisms.

There is also growing evidence that more effective approaches may involve the 'co-construction' of evidence through social interaction and collaboration between practitioners, researchers and policy-makers, identifying priorities and responding in a coordinated way (Read *et al*., 2013).

7. How do you disseminate your research?

At NFER we think deeply about how our expertise and research insights are transformed into real impact for children and young people. We always aim to go further than simply disseminating our research, as the literature on knowledge mobilisation indicates that this method alone has limited impact on practice. We strive to ensure our work can be understood and used by busy policy-makers

and practitioners by translating research findings into practical guides and, in some cases, working with intermediaries to do this.

Since 2012 we have published an annual *Impact Review*, which highlights the tangible ways that our activities improve the lives of learners (NFER, 2016). Since 2013, NFER has had a dedicated impact team, to bring a fresh and more focused approach to impact across the whole organisation, ensuring that NFER's research, assessments, products and services make a real difference to the outcomes of all children and young people.

We publish a varied range of outputs across different channels, including: accessible reports, executive summaries with key findings and recommendations, and infographics – both through our own channels as well as commissioner's and partners' channels; through events to present our findings in person; publishing syntheses on key topics, articles in journals, and NFER think pieces. We have a popular website, range of newsletters, blog, Twitter account and YouTube channel, as well as contributing to others. We also offer a range of products and services directly to schools where we believe our research expertise can improve outcomes for learners.

We regularly respond to consultations such as this one; present to policy-makers on a range of topics at different conferences and seminars; and convene roundtable discussions on topical areas with policy-makers, practitioners and key stakeholders. We are also increasingly aware of the need to work in collaboration with policy-makers and practitioners to design, undertake and use research.

8. Are there demonstrations of effective links between educational researchers, policy-makers and practitioners in this country, or internationally, that the working group should be aware of?

Partnership working and encouraging organisations to think beyond their immediate remit are important elements of effective knowledge mobilisation. We are involved in several examples of this including The Coalition for Evidence-based Education (CEBE), ResearchEd, and The Alliance for Useful Evidence.

Historically, other groups and programmes have also sought to build effective links between educational researchers, policy-makers and practitioners albeit with mixed success. Notable collaborations include the UK Strategic Forum for Research in Education (SFRE), and the Teaching and Learning Research Programme (TLRP).

Open University

Summary of main points

REF2014 confirmed the international and world-leading excellence of educational research in the UK. However, research in education faces a range of practical challenges today, for example around shrinking funding resources in the current climate of financial austerity, the impending Brexit, and the reluctance of government to engage seriously with and in educational research. These challenges threaten academic renewal and the vibrancy and excellence of educational research across the UK and beyond.

To ensure the world-leading excellence of research outputs, research environment, and impact/public engagement, there needs to be more investment into educational research in the UK. This will enable education researchers to continue developing interdisciplinary and collaborative research that addresses the challenges that we are facing currently. It will allow institutions to harness their distinctive academic expertise to nurture, build and grow researchers oriented to producing world-class research outputs. It will encourage strategic long-term partnerships with educational professionals and stakeholders thus securing substantial impact.

In addition, a large and vibrant community of doctoral students is integral to the work in education, contributing to both the creative renewal of ideas and the development of the wider research base through training future research leaders. The provision of excellent postgraduate research and training provision will ensure that the higher education sector will be able to deliver excellence in the future.

Here at the Open University we are committed to interdisciplinary and collaborative research that is world-leading and impactful in the areas of childhood studies, education futures, and language and literacies. Our field-leading work in these areas is making significant contributions to theory-building, policy and practice. We encourage the development of such research by supporting activities of both career-young and more experienced colleagues as well as postgraduate students. Working with educational professionals and stakeholders we build long-term sustained and strategic relations in the UK and beyond which secure substantial impact. However, lack of funding and the reluctance of policy makers to engage in and with research seriously is hampering our efforts.

Questions for researchers

1. What broad area of educational research do you work in, and what is your role?
   I am Associate Dean for the Faculty of Wellbeing, Education and Language Studies at The Open University. In answering these questions I am representing the work of the broad community of researchers within this Faculty.

   Colleagues work in the broad fields of Childhood Studies, Education Futures and Language and Literacies.

2. Describe the contribution your field has made to educational research, policy, teaching and learning, and society?
   Childhood Studies: We have pioneered Childhood Studies as an interdisciplinary intellectual endeavour and contributed new theorisations of children and contemporary childhoods that have impacted global policy and programmes of early education. We have also developed innovative participatory research, including the pioneering work of the Children's Research Centre with its distinctive programmes of child-led research and approach to developing children's research skills. A distinctive body of psychological research frames new practice-oriented understandings of processes in early thinking and of language/literacy development.

Education Futures: Our signature expertise and contribution concerns contemporary and future pedagogies, specifically: the development of creative pedagogies (in science, the arts and literacies); the development of pedagogies of participation/inclusive pedagogies; the development of pedagogies of mutuality; international teacher development and new models of assessment/leadership.

Language and Literacies: We have contributed field-defining research on the centrality of language to social and cultural life. Distinctive areas of excellence and contribution concern: professional discourses and practices (notably: discourses in health and social care; academic literacies); global English (notably: English for academic purposes/as an academic lingua franca; English and development; English as a medium of instruction; global English and its significance for second language learning) and technology-enhanced language learning.

3. In the past 10 years, what would you judge as the most significant contributions your field has made?
Childhood Studies: Early childhood development: delivering inter-sectoral policies, programmes and services in low-resource settings.

Education Futures: New models of possibility thinking and processes of inter-thinking – incorporated into the National Strategies for primary and secondary education.
The participatory development of Open Educational Resources that have impacted, at scale, the professional development of teachers across Africa, in India and in Bangladesh.

Language and Literacies: New technologically-mediated solutions to the challenges of second language learning. New understandings of academic/professional literacies and the significance and consequence of English as a global lingua franca.

4. What are the priorities in your field of educational research, and what is driving these?
Priority: The nature of future schooling.
Driver: The challenges of schooling in the age of globalization, social (in)justice and equity/inequity in access to educational provision.

Priority: Fostering well-being.
Driver: The increasing incidence of mental health disorders amongst children and young people.

Priority: Citizenship: fostering active citizenship that is local, national and global.
Driver: The need for active-citizenship given the fragility of the current world order.

Priority: Nurturing creativity.
Driver: The need to: equip learners to solve, as yet, unknown problems; thrive in the midst of uncertainty and learn how to cultivate possibility thinking.

Priority: Digital Literacies.
Driver: The shifting/emerging literacy practices of children and young people; the need for development of multiliteracy skills of teachers and learners.

Priority: Dialogic Pedagogies.
Driver: The need to support the social processes of reasoning and personal/collective sense-making in an information rich world.

Priority: The technological resourcing (e.g. MOOCs; Open Educational Resources; Internet of Things) of processes of teaching–learning, including (but not limited to) understanding the implications of constant connectivity for processes of teaching–learning.
Driver: The pace of current technological development.

5. What particular barriers and challenges do you face in undertaking educational research, and what changes might help overcome these? Please say whether these barriers and/or challenges apply to 'blue skies' or 'applied' research.
   A key challenge relates to the lack of funding for large-scale, ambitious, cross-institution, cross-disciplinary educational research projects (be these blue-skies or applied projects). The development of ambitious, multi-partner, 'challenge-led' calls for research funding may be a potential solution. Furthermore, the current political climate, in which educational policy makers dismiss/ignore research evidence, is a significant barrier to ensuring impactful work of significance and consequence.

6. What opportunities (including opportunities for dissemination) exist to deepen the contribution that your research field makes to policy, teaching and learning, and society?
   Multiple opportunities exist and these are largely pursued through working in partnership to secure effective solutions to educational challenges. Here at the Open University we also make effective use of broadcast media to reach out to wider society and engage them in our research (e.g. Child of Our Time: http://www.open.edu/openlearn/tags/child-our-time).

   We also develop Open Educational Resources (e.g. Open Learn: http://www.open.edu/openlearn/).

   Additionally, our expertise informs the development of OERS designed specifically to meet pressing international health-related challenges
   (e.g. http://www.open.ac.uk/africa/heat/heat-resources)
   and educational challenges
   (e.g. http://www.open.ac.uk/about/international-development/ido-africa/TESSAprojects; http://www.open.ac.uk/about/international-development/ido-asia/EIA).

7. How do you disseminate your research?
   Clearly we disseminate our work using the conventional and established methods of: publication, conference presentation, use of broadcast media, use of digital media, development of open educational resources etc. However, we typically work in participation with users and key stakeholders in a process of participatory design that ensures that their perspectives and expertise shape the research process and that the outcomes of the research are well placed to inform, and meet the needs of, professionals and policy makers.

8. Are there demonstrations of effective links between educational researchers, policy-makers and practitioners in this country, or internationally, that the Working Group should be aware of?
   e.g. UKLA (Charity) : https://ukla.org
   Cambridge Primary Review Trust (Charity): http://cprtrust.org.uk/about_cprt/aims/
   Indonesian Government (around inclusion)

Oxford Brookes University

Summary of main points

Oxford Brookes academic staff engage in a wide range of educational research activities.
Within the Education department, and beyond within the University, there is in-depth expertise across all phases of education (primary, secondary and tertiary) relating to many different subject disciplines.

More specifically, Oxford Brookes academics provide significant national and international research expertise in:

- Pedagogical approaches
- Understanding learning
- Developing Curricular Innovations
- Mentoring and Coaching
- Creativity in both teaching and learning
- Connecting and relating Theory and Practice in Learning and Teaching Contexts
- Humanities Education (particularly Geographical, Religious and Philosophical)
- Science Education (particularly related to Creativity, Innovative Pedagogies and Thinking Skills)
- Early Years Education (particularly Literacy)

Staff within education also offer significant developing national research expertise in:

- Emotional Well Being
- Art, Craft and Design education

The research engaged in (and detailed further in this document) has significantly influenced policy and practice (locally, regionally, nationally and overseas) to varying extents.

1. What broad area of educational research do you work in, and what is your role?
   The Educational Research that Oxford Brookes engages in covers a wide remit that includes Teaching, Learning, Mentoring, Coaching, Assessment and Educational Leadership and Management. There is much work carried out across Early Years, Primary, Secondary and Tertiary Education. For the REF 2014, research reported on was predominantly focused in the Primary sector. However, we have expertise in educational research that is contextualised within the Business School, Psychology, English and other disciplines within the University.

   The specialists who carry out research in various phases and subject disciplines have particular research experience and expertise in the following areas (as reflected in our current research groupings):
   - Applied Linguistics
   - Early Years
   - Humanistic Perspectives on Education
   - Inclusion and Wellbeing
   - Policy, Partnership and Leadership
   - STEAM pedagogy and learning

Applied Linguistics

Research Group Leads: Dr Jane Spiro and Dr Ana Souza
The work of this group is centred around teaching and learning languages (English and others) in school and out-of-school contexts; reviewing how aspects of learning language are developed and facilitated in various international contexts and the ways that formally and informally adults can support the linguistic

development of children. The research and impact attention is focused around the extensive work of Spiro and the developing work of Souza. Yiakoumetti (as well as the work of PhD students, such as the full-time studentship student Hamish Chalmers) will complement the international work of the group.

Projects that are in progress/have been conducted by members of the group include:

- BELMAS project on leadership in Brazilian complementary schools (Souza & Arthur)
- ESRC project on academic writing genres with Universities of Reading and Coventry (Paul Wickens)
- Teaching Fellowships on resources for reflective writing (Jane Spiro); citation and referencing (Jane Spiro with Upgrade and Nick Swarbrick); international student experience of the UK university (Juliet Henderson and Jane Spiro)
- Whole school approaches to the EAL learner in Oxfordshire schools (Spiro)
- Neurolinguistics and the correction of pronunciation (Kotzor)
- Linguistic human rights in Cyprus and Australia (Yiakoumetti)
- The re-emergence of indigenous culture and language in Hawaiian schools (Spiro)
- Student-generated materials for learning Japanese grammar (Fujino)
- The discourse of global citizenship in Higher Education (Henderson)
- Leverhulme fellowship application in progress on impact of support on student writing (Deane)
- Team teaching fellowship application in progress - on narrative approaches to sharing knowledge by Health/Life Science and Education academics (Waite, Deane, Spiro).

Early Years

Research Group Leads: Dr Elise Alexander and Dr Gillian Lake
There are several areas of development within this research group:
Peer feedback, professionalism and assessment related to Early Years practitioners, their development and becoming qualified as educators (E. Alexander, Gilson, Lake).
Children's literature in particular the use of picture books, with a focus on fatherhood and what that means educationally (Swarbrick & Tobin; D. Wright & other members of the primary team).
Policy and practice (Wild & Glenny).
Writing and Digital Art in EYs (Wild).
Developing Children's Reading (Lake).
P. Alexander is planning to develop a website and/or blog for the Early Childhood Studies community in 2016-17 as part of his Subject Coordinator role.

Humanistic Perspectives on Education

Research Group Leads: Dr Susannah Wright and Dr David Aldridge.
There are a variety of research projects that members of this group are engaged with. Some projects involve only Brookes members of staff, others connect with Oxford University and other institutions internationally. Examples of some of these projects:
Remembrance project developed by several Brookes staff (Aldridge, Haight & Wright). Related to Aldridge, D. (2014) 'How should we teach remembrance at school?', *The Conversation*, 11th November (2014) & 'War Remembrance as an Educational Moment', 2014 Guest Essays, *Wiley Military History*, November at the UCL Institute of Education. A recording of this event can be viewed on the 'Impact' journal website. In addition to considerable social media interest, the publication was picked up in three major national news outlets:

The Guardian ('Call to rethink Remembrance Day in schools', 11th November 2014)
The Conversation ('How should we teach remembrance at school', 11th November 2014)
Schools Week ('Remembrance is now a brand – what place does it have in schools?', 11th November 2015).

Inclusion and Wellbeing

Research Group Lead: Jon Reid.
There are emerging projects from two core key active researchers within this area (Colley and Reid). However, it is likely that other staff will be able to contribute and collaborate to support project work in this area. The focus of the research activity that is developing appears to be exploring and defining the challenges in Special Education Needs education, as well as working to examine possible solutions and disseminating them for the primary and secondary teaching profession. Colley is Chair of SEBDA. Colley is co-authoring a book focused on the importance of emotional development and attachment in the classroom. It is intended that this will inform national policy on SEN and Wellbeing issues.

Policy, Partnership and Leadership

Research Group Leads: Dr Janet Hobley and Prof Graham Butt
The group is interested in the following areas: the changing policy agenda for education; the new relationships being forged as schools, further education and university partnerships shift; and the types of educational leadership required to address the educational challenges of the 21st century. Through its partnerships with educationists locally, nationally and internationally it explores new ways of working in education and examine the impacts of changing education policy. Some members of the group also contribute to the work of the School's Centre for Educational Consultancy and Development (CECD).
Research themes - across the school, university and FE sectors - include: leadership, accountability and governance; higher education in further education; work-based learning, training, apprenticeships and professionalism; partnerships between educational sectors, institutions and employers; and vocational pedagogy.

Hobley has an emerging profile of research and publication on leadership and management, with a particular focus on 'vocational pedagogy' in the Further and Higher Education sectors. Butt has significant research experience in the field of policy, partnerships and leadership, with publications related to modernization and remodeling of the teaching workforce (including management of Teaching Assistants), as well as on the leadership of geography education. There is an existing legacy of various research projects in and around Oxford (Leadership for Learning; Oxford City Council's Educational Attainment project; and Recruitment and Retention project).

STEAM pedagogy and learning

Research Group Leads: Mary Briggs and Prof Deb McGregor
This research group has developed from the original focus on STEM [Science, Technology, Engineering, and Math] education by integrating art and design – transforming STEM into STEAM and promoting the intellectual and creative potential in the process. By adding the A it acknowledges the role of design and the creative aspects of across the sciences as well as the wider arts and humanities.

The group engages in research related to pedagogy and learning across the curriculum subjects within STEAM contexts. The various projects bring together academics and practitioners working on a range of learning and pedagogic issues in order to facilitate change in practice in schools, colleges and higher education through evidence based-research and/or policy developments at local, regional or national levels. Some of the projects are externally funded (by the Educational Endowment Fund; Primary Science Teaching Trust, National Centre for Excellence in Teaching Mathematics and DIAWA for example.

This research group comprises of a range of staff involved in research related to teacher development in Science, Technology, the Arts and Mathematics education. We have a core of research active science educators (Day, Gaciu, McGregor, Wilson), an acknowledged Arts researcher (Payne) as well as

emerging researchers within mathematics education (Newton, Tyson, Wilkinson) who could each contribute to place Brookes significantly on the regional, national and international map for STEAM. A common theme relating much of the work in this group is Creativity (and informal learning). Wilson has been involved with Science Oxford in an EEF funded RCT (Thinking Doing Talking) which is now being extended to involve over a 100 schools across the country. This is potentially one of the largest educational funded RCTs in England. McGregor has links with National Association of Research in Science Teaching in the USA and has influenced an EU project, SAILS, led by Dublin City University. McGregor and Duggan have established links with Victoria University in Wellington, NZ through drama and science innovations. McGregor has also been working with PSTT for several years now working on various funded activities related to exploring and defining the nature of creativity within teaching and learning science.

Members of this research group, who are already working on a number of projects, include:

1. the use of lesson study in mathematics, emerging from Japanese practice (Tyson & Shires)
2. exploring subject knowledge and its relation to learning and pedagogy particularly in mathematics (Newton) and science (Day)
3. exploring how digital technology can support the development of practitioners practice
    a. reflection through applications such as blogs (Fenwick)
    b. use of tablets to promote talk to develop identity and improve learning in science (Bird, McGregor & Frodsham)
4. mentoring of trainee teachers, comparing practice in Kyoto and Japan (Briggs, Fenwick & Wright)
5. creative approaches to learning and teaching, particularly in Science :
    a. Thinking, Talking, Doing Science (Wilson)
    b. Dramatic Science (McGregor)
    c. Pedagogy and Assessment (Frodsham)
    d. Use of dioramas for learning (McGregor & Day)
    e. Using drama to learn about scientists, including a comparative study with Oxford, England and Welling, NZ (McGregor & Duggan)
    f. Transition and Enquiry (Howard)
    g. Transition and the nature of matter (Coppard)
    h. Developing understanding about practice in forest schools (Martin-Millward)
6. learning mathematics, in and out of school (de Abreu & Newton)

2. Describe the contribution your field has made to educational research, policy, teaching and learning, and society?
   The School of Education continues to make a wide variety of contributions (as outlined above and below), not only to influence and develop national policies, but also to inform more effective practice in Early Years, Primary and Secondary schools and Further and Higher Education.

3. In the past 10 years, what would you judge as the most significant contributions your field has made?
   A wide variety of staff have contributed significantly at local, national and international levels to education policy, practice and research. The following list provides an indication of the nature and extent of influence the School has had. It is a challenge to ‘judge’ the most significant contributions, as some staff have been involved in projects that have significantly changed the practice of hundreds, even thousands of teachers, while others have informed national policies which could be assumed to have altered the nature of national schooling or teaching in Further or Higher Education.

   Aldridge has been nationally recognised to contribute to the field of philosophy, and with various colleagues (Haight and Wright) the area of Remembrance in schools.

Alexander has contributed to the transatlantic discourse regarding anthropological perspectives of personhood in high schools.

Arthur has contributed to the discourse of leadership in HE beyond the context of education.

Browne has been influential in the ways she has informed practice in the leadership and teaching within FE through her (2014) publication, *The New Further Education Sector*. She has also written about *Qualifiying to Teach Numeracy* (2011) and *Qualifying to Teach in the Learning and Skills Sector* (2007).

Butt is a founding member of the Geography Education Research Collective (GEReCo) in the UK. His research is predominantly in the field of geography education, although he has also published on assessment, teacher workload, and modernisation of the teaching workforce. His books include *Modernising Schools* (2007, with Helen Gunter), *Lesson Planning* (3rd edition) (2008), *Making Assessment Matter* (2010) and, as editor, *Geography, Education and the Future* (2011), *MasterClass in Geography Education* (2015) and *The Power of Geographical Thinking* (2017) (with Clare Brooks and Mary Fargher). He is an invited member of the UK Committee of the International Geographical Union (IGU).

Catling has been long established over several decades as a national and international geography education expert contributing to the policy and practice of primary Humanities.

Colley is nationally recognised for his work in the area of emotional wellbeing. He has presented to the DfE on issues of national importance related to special educational needs in schools. As Chair of the Social, Emotional and Behavioural Difficulties Association (SEBDA) he is collating key perspectives on emotional wellbeing for his book.

Cox has contributed to coaching and reflective practice in HE institutions through several books. Her latest (2014) book is entitled *The Complete Handbook of Coaching* (2nd Edition). She has also produced *Coaching Understood: A pragmatic Enquiry into the coaching process and Goal Focused Coaching* in 2012. These extended her *Coaching Understood: The Art and Science of helping Others* Think (2011).

Ecclestone (with Hayes 2008), offered an original perspective on the Dangerous Rise of Therapeutic Education.

Haight has contributed extensively to discussions and deliberations around gifted and talented in education. She recently edited a special issue of the International Studies in Sociology of Education and has been involved in the work of the Stephen Lawrence foundation.

Howson (visiting Professor) has generated significant national impact over several decades through his work on teacher education recruitment and retention. He is frequently quoted in the national press and on social media.

McGregor has contributed to reflection, reflective practice and thinking skills in both classroom teaching and ITE (in schools and other HE institutions in UK and USA). Some of this work is described in *Developing Thinking Developing Learning* (2007) and *Developing Reflective Practice*, with Cartwright (2012). She has contributed to the ways that drama has been taken up, and even informed national curricular policy, to influence learning science indicated through her (2014) *Dramatic Science* and (2016) *Teaching Science Creatively* (written with Precious and Davis respectively) books. She has also contributed to recent EU developments of secondary enquiry science. She is currently Chair of the ASE Research Committee, helping the subject association develop ways of integrating research into practice in science classrooms.

Morrison (visiting Professor) has written extensively, over several decades, on research methodology and methods, as well as Educational Leadership.

Payne is a prominent member of various local, national and parliamentary committees advising about the nature of Art, Craft and Design Education in England.

Souza has contributed significantly through her international linguistics projects including Brazilian parents and language learning in different contexts. Her most recent book (2016) *Portuguese as a Heritage Language in London: home, church and school contexts* illustrates her research focus.

Spiro through her creative literature and contributions to linguistics education. She has described how writing approaches are influenced by their intended messages in *Changing Methodologies in TESOL* (2013) and she has provided support for others on educational writing through her pocket study guides on *Reflective Writing*.

Wild through her work on *Themes and Issues in Early Childhood* (2013) has influenced national policy. She has also written (in 2007) for would-be-teachers in *Early Childhood Studies: A Reflective Reader*. Her work with Oxford University on teacher recruitment and retention will inform local policy and practice.

Wilson through her work with Science Oxford generating (and testing various) ways to innovate practice in primary science and contribute to creativity in primary schools and thousands of teachers across the whole of the country.

Yiakoumetti is a linguist researching regional and international variations in learning a second language and the implications for education. She has published many highly respected papers in this area.

Several staff are also on a range of editorial boards of highly rated educational journals.

1. What are the priorities in your field of educational research, and what is driving these?
   There are a number of foci and priorities for our educational research. Primarily it is about understanding and applying research related to learning and teaching (policy and practice) that extends across Initial Teacher Education (ITE) and into different subject disciplines, not only in schools (for qualified staff), but also in FE and HE (for lecturers), to develop research-informed practice.

   More specifically within the teaching context:
   - Encouraging trainees, teachers, mentors, senior school managers and policy-makers to know where to look to be informed, use and apply research findings in their practice.
   - Developing events and projects that promote, 'translate' and disseminate research findings for local schools, their teaching staff and leadership teams

   Engaging in research to benefit Teacher Education (TE)
   - Working with mentors (and teachers in partnership schools) in action research.
   - Retain effective working relationships with teachers and senior managers in school partnerships to be able to develop from small pilot studies to larger scale more significant projects (regional, national and international) that can aid development of their understanding of learning, pedagogy, assessment and school/educational leadership.

   Engaging in educational research that informs local, national and international policy (as well as practice)

- Support staff to be leaders and/or collaborators in pilot and large scale projects
- Work pro-actively, as well as, responsively to research calls from government and other stake-holders in local, national and international education.

2. What particular barriers and challenges do you face in undertaking educational research, and what changes might help overcome these? Please say whether these barriers and/or challenges apply to 'blue skies' or 'applied' research.
   The following challenges relate to 'applied' research when involving personnel (children/students; teachers; senior managers; governors; parents etc.) in schools for educational research projects:
   - Time (and supply cover funding) for teachers to be involved in action-research (involving re-developing their practice) and/or gathering evidence of views, practice, impact of any policy changes etc.
   - Ethical issues involving children/students in studies of school happenings, events or projects.
   - Lack of flexible research assistance that is of a good quality, to generate research tools; carryout evidence gathering and process data (in various analytical ways).

   Blue Skies research requires time to be 'freed up' for unfettered thinking between like-minded academics. This is obviously expensive in terms of time for academics when there are strong imperatives to 'deliver' outcomes, on behalf of the institution, that are funded by external agencies (with their particular agendas).

3. What opportunities (including opportunities for dissemination) exist to deepen the contribution that your research field makes to policy, teaching and learning, and society?
   These tend to be few, unless they are current local or national 'policy' and relate to public concerns or demands.
   Support for academics to develop and sustain their networks are crucial for this.

4. How do you disseminate your research?
   In various ways:
   1. Publications:
      - professional journal/magazine/newspaper articles
      - peer-reviewed journal articles
      - website pieces
      - social media (blogging/tweeting etc.)

   2. Presentations:
      - Subject/teacher/research conferences
      - Local/regional/national meetings and committees
      - Invited speakers at Local/National/International conferences and PD events

   3. In roles that interact with school leadership and management :
      - as tutors for would-be-teachers
      - being mentors in schools;
      - being governors for schools.

5. Are there demonstrations of effective links between educational researchers, policy-makers and practitioners in this country, or internationally, that the Working Group should be aware of?
   Participation in various nationally funded initiatives such as the Excellence in Cities (Gifted and Talented; Stephen Lawrence related) project (Wilson, Haight)

Science Education projects with National, International and EU impact, such as EEF funded TDTS (Wilson), SAILS (McGregor).

Invitations to participate in various Select Committee Meetings/Government and DfE Consultations and Events (Browne, McGregor, Wild, Wilson).

Membership of national research groups (such as the Geography Education Research Collective (Butt), Association of Science Education (McGregor & Howard), the Art and Design Council (Payne) and international research groups (International Geographical Union – Commission on Geography Education (IGU CGE)) (Butt) and National Association of Research in Science Teaching (NARST) (McGregor).

Questions for university management

1. What grouping best describes your institution (e.g. Million + Group, University Alliance, Russell Group, etc.)?
   Oxford Brookes is probably best identified as a post 1992 University, although it has been well established as an educational institution for over 150 years.

2. How do you support educational research in your institution? How has the level of this support changed over the past 10 years (e.g. particular investments in staffing and training and development), and why?
   We have supported educational research through QR Funding; through Central and Faculty research funding. Some initiatives in teaching and learning support activities that are linked to educational research. The level of support has not changed significantly over the last ten years.

3. Have you observed that educational research is becoming more interdisciplinary (please provide details) and, if so, how are you accommodating this?
   Inter-disciplinary work is certainly now on the agenda though it builds upon past practice. Educational researchers link with subject specialisms such as international relations, philosophy. For instance Wright is co-operating with International Relations researchers and Aldridge with philosophers. Moreover researchers in other departments such as Walkington (Geography) co-work with researchers in the School of Education (Butt). We are encouraging these forms of institutional co-operation.

4. Through what mechanisms do you disseminate the educational research your institution undertakes?
   Research is disseminated within the University via web-sites and Faculty and University reports. More widely research is disseminated through research articles and scholarly publications as well as social media.

5. During the next 3 years, do you expect to invest more or less in supporting educational research? Why is this so?
   We would envisage to maintain our general support for educational research. We will be taking a special interest in research into research and teaching within Higher education. We have already begun to do this but it has been further stimulated by national developments such as TEF and REF developments.

Questions for teachers, school and college leaders and teacher trainers

The following six questions are responded to as a University involved in teacher training and teacher education (through professional development, postgraduate/masters degrees and doctoral degrees).

1. How are you involved with teaching in schools and colleges?
   As a University with an Education department, hosting over 650 students (from undergraduates to postgraduates and doctoral students) we are involved with hundreds of schools in the local area. Through various research projects we are also involved with schools nationwide and even internationally (in New Zealand, Brazil, China etc.).

2. Have you been involved in academic educational research?
   As described above in previous section entitled 'Questions for Researchers'.

3. How have educational research findings informed your work, and how has your usage of educational research findings changed over the past 10 years?
   Besides all the various research projects that staff have carried out (outlined above) and integrated into their teaching of students (and teachers), staff regularly draw on well-established and published research work. Up-to-date research has become more prominent and interrogating 'how' the research has been carried out has become more prominent.

4. How easy do you find it to identify access and make use of educational research, and what are your main sources of educational research findings?
   This is something staff 'naturally' do in their teaching. As staff are actively engaged in research, effective practice (to teach students) draws from a review of 'what-do-we-already-know' about 'what works'. Staff will reference these for students to verify the suggestions offered. Staff will regularly share research findings through seminars/meetings/discussions. Often they are engaged in projects/teaching that requires them to know about the latest research/developments. As academics they are constantly discussing and checking for the latest research findings to inform their 'approach' to teaching as well as the 'content' of their teaching. Their sources of research data will be email updates/social media updates/proactively following particular researchers/reading the latest professional and academic journals in their area etc. The University environment is one that provides a wide range of research resources.
   Academic staff are also able to quite readily 'interpret' and 'enact' from the latest research data/information they may have received/recently read. As teachers they are likely to 'apply' and 'model' the latest research findings in their marking, assessment and reporting of learners progress and attainment.

5. Are there demonstrations of effective links between practitioners, policy-makers and researchers in this country, or internationally, that the Working Group should be aware of?
   Please see earlier responses to Questions for Researchers: point 8.

6. What would be your priorities for educational research,[57] and why?
   More in-depth studies (and longitudinal work) that examine 'why' particular large scale (or indeed smaller scale studies) do (or do not) produce quantifiable and statistically significant outcomes. There is an increasing trend, currently, for Randomised Control Trials (RCTs). The outcomes of these kinds of studies indicate how 'far' or how much of an impact an intervention has had. The EEF/Sutton trust have produced Teaching and Learning Toolkits that indicate the extent of impact from the 'effect sizes' (and evidence) that the findings from these studies have claimed to show. The toolkit covers 30 topics, including aspects of learning such as 'Collaborative learning', 'Digital

[57] These could, for instance, be concerned with identifying research questions to be addressed to improve practice, or improving the usage of educational research.

Technology', 'Peer Tutoring' or 'Small Group Tuition'. It would be helpful for teachers to know what the key elements of the interventions (i.e.; in the classroom setting what 'must' they do and what should they 'not' do!) should be paid attention to produce the significant effect sizes.

Examining why some studies produce contradictory evidence, e.g.: two significant studies have shown both positive and negative outcomes of the impact of Teacher Assistants. This indicates there needs to be clarity or further investigations into the methodologies of (large scale) research studies. At first glance, of course, TAs can be used in a wide variety of ways, so the extent to which they are 'used' in different schools will vary significantly.
Another example is CASE and the EEF-funded Let's Think for Secondary schools. The most recent evidence this autumn indicates there is not a significant effect, yet in the 1980, 1990s and even into noughties there were studies that showed a statistically significant benefit for students 5 years later (after the Thinking Science intervention). Why is that? There needs to be research that provides more 'accurate' accounts of the 'methodologies' used and applied, particularly in large scale RCT projects so that when studies focused on the same/similar issue show significant/not significant evidence there is an open opportunity for reflective discussion about the nature of the research carried out. The RCTs can be very expensive to 'run', perhaps there should be more public (research community) scrutiny of the approach of these. There certainly needs to be thorough evaluative studies looking at the ways these are conducted to explore what lessons there are for teachers, educational researchers and funders of this type of research.

There should also be studies that look at the ways that Hattie's work (illustrated in *Visible Learning*) is taken up by schools. He suggests that his meta-analyses show that what works effectively, so 'why' and 'how' have schools that have responded to his presentation of 'evidence' made a difference? Hattie (2009 : 243), for example, lists effect sizes for teacher as 'facilitator' and 'activator', exactly how teachers might put these ideas into practice and whether or not adopting them in different ways has more or less of an effect in their particular school/situation* is an area to research more deeply.

Teachers, in particular, are likely to be confused by the presentation of impressive 'data sets', 'effect sizes' and meta-analyses, but will have neither the time nor experience of research approaches to be able to consider when studies are more or less robust and therefore more or less informative for their (particular situation, school context and therefore, their) practice.

We need more 'accurate' translation of research projects/meta-analyses and large scale outcomes that provide guidance for teachers about what to pay attention to.

More narrative enquiries that explore in-depth the impact of national policies on teachers and children/students in schools/FE/HEIs.

More situational* and comparative (not quasi-experimental that reflects RCTs) research, i.e.: what works well in particular situations (e.g.: public v private settings; challenging schools and those achieving 'outstanding'; NQT and experienced teacher pedagogies strategies; teacher v learners' perspectives of 'practical work'; enquiry; assessment generally; AfL; etc.)

The Psychological Society

Summary of main points

- Educational research in the field of biomedical sciences is important in developing and evaluating innovative approaches to undergraduate and secondary school teaching that:
    - Encourages secondary school students to consider studying biomedical sciences at university, and potentially a career in that field;
    - Enthuses secondary and tertiary level students, and develops their practical, numerical and problem-solving skills;
    - Makes good use of the wide range of digital educational resources currently available;
    - Facilitates engaging, efficient and effective teaching for the large student cohorts that currently undertake university degrees.

- Excellent teaching and educational research/leadership should be appropriately recognised and rewarded in career progression in Higher Education; there is currently a lack of parity between recognition for educational achievements compared with discipline-based research achievements.

- The Physiological Society provides support in a number of the areas above:
    - Through grants awarded to educational researchers;
    - Through hosting conferences and workshops that disseminate the outputs of educational research and encourage sharing of good practice;
    - Through its work (sometimes in collaboration with other organisations such as the Royal Society of Biology, the Heads of University Biosciences and the Academy of Medical Sciences) in raising awareness of the importance of recognising educational achievements in career progression in higher education.

- The Physiological Society is keen to collaborate with like-minded organisations in all of the above areas. We are currently exploring the possibility of working with the Institute of Physics and the Royal Academy of Engineering in relation to the status of teaching in career progression in HE. This subject also formed an important strand of fringe events that we hosted in partnership with the think tank, Demos, at the Conservative, Labour and SNP party conferences in 2015 and 2016.

Questions for funders

1. Please describe your organisation, including the types of educational research you support, and the proportion of your research budget that is spent on educational research.
   The Physiological Society is a learned society with a membership of over 3,600 scientists from over 60 countries, which supports physiological research and education. It also promotes the understanding of physiology at all levels of society through its outreach, public engagement and policy activities. The Society funds approximately £25k of educational research per year through the David Jordan Award and International Travel Grant for Teachers schemes, both of which are awarded through The Society's Education and Outreach Committee. This represents ca. 15% of the annual funding awarded through that committee and it is used to support the development, evaluation and dissemination of new approaches to teaching physiology, primarily at an undergraduate level. [Note that other Committees within The Physiological Society disperse funding for other purposes, for example in hosting scientific meetings].

2. What are your priorities for your educational research, how are they determined and what influences any change in these priorities?
   Funding priorities are determined to be those that fall in line with the over-arching priorities of The Society and are discussed by Society Committees and Council (for further details please see Questions for Subject Associations, q3). Funding is specifically aimed at educational researchers who are early in their careers or have recently switched to an education-focused career. Applications with far-reaching impact, beyond individuals, institutions and potentially with application overseas are considered favourably.

3. To what extent do you, or would you, collaborate with other funders who have similar missions?
   For applicants that are funded by The Society through these schemes, we would hope (and anticipate) that it would provide a spring board (seed-funding) to further funding/recognition from other organisations such as the Higher Education Academy, other learned societies or applicants' own universities. The Society has previously considered offering joint funding with the HEA and we would be keen to revisit such discussions.

4. Is it becoming easier or more difficult to fund research that aligns with your objectives, and what do you think could be responsible?
   The Society receives a lower number of applications for teaching-related grant schemes than we would hope for; we consider this may be partly because staff within the biomedical sciences who carry out educational research often do not have time to conduct and document their research and innovations formally. Furthermore, individuals that do conduct such work are typically not recognised/rewarded for their educational research efforts by their HEIs, which reduces motivation to carry out the work. The Society believes an appropriate level of recognition and reward for such activity would contribute to improved teaching practice, and has supported a large body of work in this area including a publication profiling 32 academics whose career progression has been supported by achievements in teaching and educational research/innovation: (http://www.physoc.org/sites/default/files/page/Recognising%20Teachers%20FINAL.pdf). Further details of The Society's work in this area can be found below (Questions for Subject Associations, q4).

5. Are there demonstrations of effective links between researchers, policy-makers and practitioners in this country, or internationally, that the Working Group should be aware of?
   The Society works with other organisations to host workshops sharing evidence-based best practice amongst university teachers, for example our January 2016 workshop, which we held with the Royal Society of Biology and the British Pharmacological Society. This workshop also included a session discussing strategic aspects of the Teaching Excellence Framework which included representation/input from government (BIS), the Director of the Higher Education Policy Institute Think Tank, university educational researchers and policy experts from all three learned societies.

6. How do you disseminate, and make use of, the educational research you support?
   The Physiological Society hosts international meetings, such as Physiology 2016, which was held in Dublin in collaboration with the American Physiological Society. At such meetings we have a strong presence of education and teaching activities, including posters, prize lectures and oral communications.

   We also support our members in hosting regular one-day regional teaching workshops to encourage sharing of good practice (see http://www.physoc.org/higheredworkshops) and support educational professionals (usually members of The Physiological Society) to host similar events at their own institutions.

   Moreover, The Society encourages grant holders to disseminate their research and innovations as

widely as possible, with some resources being accessed and used internationally and posters presented at international conferences.

Questions for subject associations

1. How do educational research findings inform your work?
   The Physiological Society is currently developing a physiology MOOC targeted at sixth form / HE transition students which will employ evidence-based ways of delivering online material robustly and engagingly.

   We fund the execution of educational research through our Teaching Fellowships and Teaching Grants (see Questions for Funders, q1). These awards are partly based on the educational research track record of applicants.

   We disseminate high quality educational research findings through peer-reviewed posters and presentations at our annual (international) Main Meeting and regular regional Teaching Workshops; for further detail see Questions for Funders, no 6.

   One of our seven Society 'themes' is the Education and Teaching Theme which provides a forum that enables our members to share good teaching practice and their educational research findings informally, as well as through Society-funded workshops. This Theme has a current membership of 1,075 (this represents members (43%) and non-members (57%) of The Society, and therefore expands beyond the discipline of physiology).

   We award the annual Otto Hutter Physiology Teaching Prize, an important aspect of which is to reward university teachers who have made an outstanding contribution to developing innovative and effective teaching approaches, founded on sound, discipline-based educational research.

   We award Public Engagement and Outreach Grants, which are judged partly on the extent to which an evidence-based approach will be taken in delivering educational activities to the public.

   In collaboration with other subject associations (the Royal Society of Biology, Heads of University Biosciences and the Academy of Medical Sciences) we have conducted research investigating the extent to which teaching and educational scholarship is rewarded through career progression in higher education (see:
   https://www.physoc.org/sites/default/files/page/Improving_the_status_and_valuation_of_teaching_in_the_careers_of_UK_academics_WEB_version.pdf)

2. How easy do you find it to identify, access and make use of educational research, and what are your main sources of educational research findings?
   Our main sources are our members, who give us access to the educational research from their universities and form an active community wanting to discuss and implement educational research.

   We work with a number of sister societies to share educational research more widely, so have access to expertise from across the life sciences.

3. What would be your priorities for educational research, and why?
   a) Research that underpins the development and evaluation of effective, engaging and efficient ways to deliver physiology teaching/education at secondary school level and within universities. Priorities within this include supporting research to optimise ways of (i) preserving 'hands on' physiology practical teaching in school and university curricula; and (ii) improving numeracy and data interpretation skills amongst school leavers and graduates. Indeed, The Physiological Society is currently supporting the development of a Massive Open Online

Course (MOOC) aimed at inspiring secondary school students about physiology and easing their transition between secondary and higher education. One of the aims of the MOOC is to encourage data handling skills and increase students' confidence in this area.

These priorities align with one of the aims of The Physiological Society, which is to sustain/raise the profile of physiology amongst school pupils and university/college students (including medical, dental, nursing, vet and allied health professional students) thereby ensuring continuity in the pipeline of appropriately skilled graduates entering the workforce. This needs to be achieved despite increasing student numbers, diminished resource and increased pressures on teaching staff in other areas of their careers (e.g. discipline-based research and administration). It is therefore important for innovative teaching practices to be informed by educational research such that new approaches are both effective and efficient in staff time and resource, e.g. through making appropriate use of the wide range of digital educational resources currently available. For example, The Society funded a grant in 2014 that sought to identify and help alleviate the barriers to implementation of electronic resources (and specifically open educational resources, OERs) in physiology education. We also hosted a workshop for HE teachers delivered by ADInstruments that demonstrated LabTutor – a software package that facilitates hands-on training in both laboratory settings or in a virtual setting.

b) The collection and analysis of further data on the extent to which educational activities (including educational research) contribute to career progression in HE. This, together with our existing data (see below) could then be used to influence policy - both government and university senior management – in ensuring that such activities are recognised and rewarded appropriately.

4. Are there demonstrations of effective links between practitioners, policy-makers and researchers in this country, or internationally, that the Working Group should be aware of?
The Society continues to work with like-minded organisations (including the Royal Society of Biology, Heads of University Biosciences, the Academy of Medical Sciences and the British Pharmacological Society) to share best practice in teaching and to encourage appropriate reward and recognition of teaching excellence. We are currently exploring additional potential collaborations in the latter area with two other learned societies - the Institute of Physics and the Royal Academy of Engineering.

In 2014, we produced a report:
https://www.physoc.org/sites/default/files/page/Improving_the_status_and_valuation_of_teaching_in_the_careers_of_UK_academics_WEB_version.pdf) that highlighted the need to recognise and reward excellent, evidence-based teaching practice and to identify a means of evaluating good teaching. Research for this report included a survey of more than 250 academics working in the medical and biological sciences, together with evidence from a workshop attended by funders, national bodies, learned societies, and representatives from HE including Vice-Chancellors.

In January 2016, at a workshop hosted by The Society, education professionals and policy experts convened to share best practice and to discuss the government's proposal for a Teaching Excellence Framework (TEF). Speakers included representatives from learned societies, as well as the Director of HEPI (independent Think Tank) and a representative from Government. There was also a poster session over lunch, to encourage discussion and networking.

The Physiological Society also hosted well-attended fringe events at the 2015 and 2016 party conferences, in collaboration with the Think Tank Demos. The topics were respectively "Higher Expectations: Who Cares about Teaching in HE?" (Conservative and Labour conferences) and "TEF vs REF: Are Teaching and Research Now Adversaries?" (Conservative, Labour and SNP

conferences). Panel speakers included Lord David Willetts, Wes Streeting MP, Roberta Blackman-Woods MP, Roger Mullin MP, Carol Monaghan MP, Shirley-Anne Somerville MSP, Nick Hillman (Director of HEPI) and John Gill (Editor, Times Higher Education).

Royal Society of Biology

The Royal Society of Biology (RSB) is a single unified voice for biology: advising government and influencing policy; advancing education and professional development; supporting our members, and engaging and encouraging public interest in the life sciences.

The Society represents a diverse membership of individuals, learned societies and other organisations. Individual members include practising scientists, students at all levels, professionals in academia, industry and education, and non-professionals with an interest in biology. For this response we have received significant input from the Biology Education Research Group[58], a special interest group of the RSB.

A large proportion of the policy work we do is in collaboration with other Science Learned Societies including the Association for Science Education (ASE), Institute of Physics (IoP), Royal Society (RS) and Royal Society of Chemistry (RSC). In alliance with the ASE, IoP, RS and RSC we have commissioned research to inform our policy positions and we draw on educational research in our responses to consultations and inquiries[59]. We work closely with our member organisations[60] who work within specialist areas of the biosciences when developing new policy positions and responding to consultations to ensure that we are reflecting the views of the sector. For education research within higher education, we and many of our other member organisations have worked closely with the Higher Education Academy (HEA). Last year we conducted research on issues in bioscience teaching[61]. In 2014 with the Heads of University Biosciences (HUBS), the Biochemical Society and the HEA we completed an audit of the practical work taking place in the higher education sector[62]. We also conducted research with the Physiological Society, HUBS and Academy of Medical Sciences on the status and valuation of teaching within higher education[63].

Some of our member organisations fund research, for example the Physiological Society offers grants to educational researchers[64]; the grants are aimed at researchers early in their careers or those who have recently switched from research to teaching. These grants enable awardees to carry out a piece of educational research or develop an educational resource, recipients are encouraged to disseminate their findings as widely as possible. The RSB with the HUBS special interest group also fund the sharing of educational research in the biosciences with small grants of £1000 for teaching academics to fund teaching and learning workshops[65]. There is also an annual spring meeting of HUBS which focuses on teaching and learning within the biosciences[66]. Many of our member organisations host meetings that focus around teaching within their specialist areas as well as having awards to specifically recognise teaching innovation and expertise.

In common with other Learned Societies, the RSB has a particular interest in what can be done to ensure the engagement of learners with our subject, to secure their knowledge and understanding and develop the skills that are needed for life now and in the future. Our proactive work with the Biology Curriculum Committee[67] to consider the future of biology education in schools is informed by current education research and will evolve as new evidence is collected on the impacts of current educational reforms. We recently hosted an event that focused on the transition from secondary school to higher

[58] The Biology Education Research Group https://www.rsb.org.uk/education/berg/education-research
[59] https://www.rsb.org.uk/policy/consultations/consultation-responses
[60] Organisational membership of the Royal Society of Biology https://www.rsb.org.uk/membership/organisational-membership/full
[61] Teaching and learning issues in the biosciences https://www.rsb.org.uk/images/Teaching_and_Learning_Issues_in_the_Disciplines_-_Society_of_Biology_Final_Report.pdf
[62] Audit of practical work https://www.rsb.org.uk/policy/education-policy/higher-education-policy/ug-audit-of-practical-work
[63] The status and valuation of teaching in higher education https://www.rsb.org.uk/policy/education-policy/higher-education-policy/status-and-valuation-of-teaching
[64] Physiological Society Teaching Grants http://www.physoc.org/teaching-grants
[65] Teaching and learning workshop grants https://www.rsb.org.uk/education/hubs/hubs-grants
[66] Heads of University Biosciences Meetings https://www.rsb.org.uk/education/hubs/hubs-news-and-events
[67] Biology Curriculum Committee https://www.rsb.org.uk/about-us/committees/biology-curriculum-committee

education[68]. This event allowed us to gather input from the bioscience community and open up discussions surrounding the development of practical and transferable skills in biology at school. At the event we presented a document for discussion[69]; we encourage our members to engage with the work that we are doing and have the document openly available on our TalkBiology forum[70]. Our membership have suggested evidence that could be drawn upon to inform our work as well as contributed their individual expertise.

The Biology Education Research Group is a special interest group of the RSB. This group is composed of over 60 individuals who are either active in or have an interest in education research within the biosciences, this could be at school and/or university level. Individuals in this group are conducting research across a wide variety of areas from the use of arts and drama to teach biology to assessment strategies to the value of outdoor learning (see Appendix 1).

The group meets to discuss issues relevant to education in schools, colleges and higher education as well as share the research that they are undertaking with researchers in other institutions. At the Association for Science Education Annual Conference BERG members host a day of talks[71] which enables them to share their research with teachers in schools. Members of BERG have strong links across Europe and several of them have attended and presented research at the European Researchers in Didactics of Biology (ERIDOB) conferences[72]. BERG members have also contributed articles to the Journal of Biological Education[73] which has celebrated its 50th anniversary this year.

We have consulted with members of the Biology Education Research Group and the following areas have been highlighted as requiring additional educational research evidence:

Impact of current educational reforms

We believe that it is essential that the impacts of the recent educational reforms are monitored. Any evidence that is gathered can then help inform future curriculum and assessment design. A number of organisations have begun the process of collecting data and monitoring the changes, however as the reforms are implemented in stages (reformed A levels started teaching in 2015 whilst reformed GCSEs started teaching in 2016) longitudinal research studies are crucial. Research could consider the reforms impact on:

- student understanding of concepts (of substantive biology and of evidence)
- students development of practical and transferable skills
- student engagement with the subject
- numbers of students continuing to study the subject (GCSE to A level, A level to degree)
- how content and skills are taught

Assessment

We think it is important that there continues to be research conducted on the effectiveness of different summative and formative assessment methods. We would like research to consider whether changes in assessment impact on the way biology is taught in the classroom (and in the lab and out in the field) and how assessment can be a driver for positive learning and teaching experiences.

Part of the reforms has seen the removal of coursework and the direct assessment of practical work contributing to the final grade in biology examinations at GCSE and A level. The understanding of practical work and practical skills are now being assessed through written responses to exam questions.

[68] Transition from school to higher education https://www.rsb.org.uk/about-us/committees/biology-curriculum-committee/curriculum-committee-supporting-transition-from-school-to-higher-education
[69] Framework for post 16 biology discussion document https://www.rsb.org.uk/images/Developing_a_framework_for_post_16_biology_qualifications_-_For_transition_event.pdf
[70] TalkBiology forum https://talkbiology.rsb.org.uk/
[71] The Biology Education Research Group https://www.rsb.org.uk/education/berg/education-research
[72] ERIDOB https://www5.kau.se/eridob-2016
[73] Journal of Biological Education https://www.rsb.org.uk/education/publications/jbe

Assessment of practical skills and the assessment of students understanding of the nature of science and the ideas and evidence underpinning practical work require different assessment approaches.

We would like further evidence collected around the effectiveness and validity of assessing hands on practical skills through written responses to exam questions. We believe that there could be great value in collaborative working between other practical subjects such as geography to compare across disciplines. In addition we would like further evidence to establish how to assess students understanding of the process of science and how practical and theory relate to each other.

Further we recommend research to develop effective ways to assess students' reasoning about the power, limitations and relevance of science – an objective included in the curriculum but widely neglected in teaching and assessment due in large part to the lack of well-developed guidance for teachers and model assessments. The "Working Scientifically" strand supports students to better understand the nature of science is often not well integrated into teaching and teachers have difficulty assessing this.

Practical work in the lab and in field

Science involves investigation, and biology along with the other sciences is an inherently practical subject. Laboratory and fieldwork is composed of several aspects, the hands on practical skills that develop with practice (e.g. manual handling skills / dexterity, ability to follow protocols, being able to work safely) alongside an understanding of the evidence which is required for decisions about the quality of data (e.g. including how the work is designed, about the sample size and representativeness, about the quality of the instruments or observations) and this sits alongside the theory. Both the theory and the practical are required for an in depth understanding of biology.

In light of the changes to curriculum and assessment methods, we would like evidence gathered on the perceived importance and value of practical work in science subjects, from the perspectives of both students and teachers.

The quantity and quality of practical work that is happening in schools needs to be monitored, as well as considering if it is developing the skills and understanding of biology's empirical basis needed for students to continue on to further study of the subject.

It would also be useful conduct research into the impact that participating (actively taking part) in practical work (in the lab and in the field) has on student learning and engagement with biology.

Curriculum content and skills

We would welcome further research into establishing what makes "an effective biology curriculum" that can be developed to meet multiple purposes, for example:

- to be engaging and provide a platform for progressing onto further study
- ensuring that it establishes the link between theory and practice
- to raise awareness of biology and biology related careers
- encourages learner independence
- develops transferable skills and supports students literacy and numeracy

We think that there is a need for further research into Threshold Concepts in Biology[74], how learners understanding of concepts progress from early years through to higher education, this would be helpful in informing future curriculum development.

[74] Ross, P.M, Taylor, C.E., Hughes, C., Kofod, M., Whitaker, N., Lutze-Mann, L. & Tzioumis, V. (2010). Threshold concepts: challenging the culture of teaching and learning biology. In J.H.F Meyer, R. Land & C. Baillie (Eds.),
Threshold Concepts: from theory to practice Rotterdam: Sense Publishers.

There are also areas in the curriculum where additional research could help identify successful ways to teach the subject, for example in the reformed national curriculum for science, evolution and genetics are taught in primary school and at key stage 3. Biology education and in particular genetics education impacts not only students' understanding of biology concepts but also informs their understanding of what it means to be human. We would welcome research which explores these wider implications and which considers how different pedagogies impact on students' developing scientific literacy and enthusiasm for science related careers.

Teacher education (initial and ongoing)

Within the UK and across the world there are a variety of different routes that can be taken to becoming a qualified teacher. The success of these different routes in terms of developing excellent teachers and retention of them within the teaching workforce needs to be evaluated. To sit alongside the recommendations that are being made for core content within initial teacher training (ITT)[75], research could establish how, and how much subject and pedagogic content knowledge is developed during ITT and how this may vary between different types of provider. Additional research may help to identify the professional development needs of teachers early on and in later stages of their career.

Educational Outcomes for Students

With the recommendations that have been proposed to expand selective education places within the government consultation "Schools that work for everyone"[76] we believe there needs to be a better evidence base that evaluates the impact of different types of school (grammar, independent, free school, academy) on broad student outcomes.

[75] Department for Education (2016) A framework of core content for initial teacher training https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/536890/Framework_Report_11_July_2016_Final.pdf
[76] Department for Education (2016) Schools that work for everyone https://consult.education.gov.uk/school-frameworks/schools-that-work-for-everyone/supporting_documents/SCHOOLS%20THAT%20WORK%20FOR%20EVERYONE%20%20FINAL.pdf

Royal Society of Chemistry

Main summary of points

- We support chemistry education and have members who are both active educational researchers and who have an interest in educational research findings
- We endeavour to take an evidence-informed approach to our work
- There are a number of barriers to the effective use of educational research
- There is evidence that suggests educational research has little impact on classroom teaching
- Our priority is to make sure findings of educational research can be useful to chemistry teachers

Questions for subject associations

1. How do educational research findings inform your work?
   We use a range of different types of evidence and research to inform our activities. The research we use ranges from systematic academic research reviews to anecdotal feedback from our networks. We aim to use robust research to inform our activities wherever possible. However, there are a number of barriers we face to achieving this for all our work (explored further in Question 2). We continuously look to increase the evidence-informed approach we take and hope the findings of this project will inform our work programmes.

   We use both externally produced research findings and our own internally conducted or commissioned research (Examples of sources of research are included in Question 2)

   Below are some examples of the different types of research we use in our resource production, CPD provision, and policy work.

   Resource production:
   - Culturally established pedagogy informed by academic research
   - Surveys (e.g. teachers, students, teacher trainees, users)
   - Interviews
   - Competitor/comparison analysis
   - Key opinion leaders research
   - Gap analyses
   - Anecdotal intelligence

   CPD provision:
   - Surveys (e.g. teachers, students, teacher trainees, users)
   - Key opinion leaders research
   - Internal literature reviews
   - Evaluation findings
   - Commissioned authors are informed by academic educational research
   - Anecdotal intelligence

   Policy work:
   - Policy research – systematic reviews and primary research
   - Surveys (e.g. teachers, students, teacher trainees)
   - Interviews
   - Focus groups
   - Academic educational research
   - Data analysis

- Anecdotal intelligence

A substantial area of activity relating to educational research is in its communication, summation and translation. This is described in our response to Question 3.

2. How easy do you find it to identify, access and make use of educational research, and what are your main sources of educational research findings?
Identifying, accessing and making use of educational research
We endeavour to take an evidence-informed approach to the work we do and use robust research to inform our activities wherever possible. However, there are some challenges in identifying, accessing and making the best use of educational research in our work. These challenges also exist for our members who have an interest in educational research:

- There are **access barriers** to educational research (e.g. through pay walls), particularly research that is not chemistry-specific.
- **Time** constraints are another challenge we face with accessing educational research. For example, reactive policy work often has short deadlines.
- **Specialist terminology and structure** of educational research papers can be a barrier. The research is written specifically for an audience of other researchers making it difficult to assess a piece of research's importance to us. This links to the time constraints as it takes longer to review the literature if the terminology is less accessible.
- There may be **insufficient research** on a particular topic or in a particular context for it to be useful or directly relevant to our work and activities.

These challenges will impact on the sources of educational research used.

Main sources of educational research findings
We use a variety of different types of *academic educational research* and *wider education research* to inform our work. We do not use *context-based research* to inform our work. A core part of our activity is to provide a community of educational research and practice relating to chemistry, for all the three types of educational research (explored more in question 3).

External publications examples include:
- Think tank research reports (e.g. Public Policy Exchange, Education Policy Institute, Higher Education Policy Institute, Institute for Public Policy Research)
- Education/science research organisation/charity research reports (e.g. Education Datalab, Education Endowment Foundation, Sutton Trust, NfER, Gatsby, Wellcome Trust, Cambridge Assessment, other subject associations)
- Government body commissioned research/evaluation reports (e.g. DfE, Ofqual)
- Publications/surveys from teaching/student unions or similar organisations
- Academic educational research journal publications

Royal Society of Chemistry sources:
- Chemistry Education Research and Practice journal (CERP) (free to access)
- Education in Chemistry (EiC) magazine

3. What would be your priorities for educational research, and why?
   The Royal Society of Chemistry's current priority is to make sure the findings of educational research can be useful to chemistry teachers. Currently educational research has little impact on classroom teaching[77] [78].
   Our current offering includes:
   - **Dissemination** of educational research (*academic* and *context-led*) via the online, free to access Chemistry Education Research and Practice journal. (4 issues are published a year, and the journal has an impact factor of 1.802)
   - **Translation** of educational research through Education in Chemistry. This magazine publishes articles and features for teachers that show how to apply research-based teaching techniques in chemistry education. (The EiC website receives on average 44,257 visitors each month and has a print circulation of 9500)
   - **Building a community** of educational research and practice that relates to chemistry.
     - Education in Chemistry has an engaged online community bringing chemistry educational research to teachers, including on social media
     - Member interest groups and networks including Chemistry Education Research Group, Tertiary Education Group, and Secondary and Further Education group
     - Conferences and events e.g. supporting the annual Variety in Chemistry Education conference and Methods in Chemistry Education Research
     - Other online activity such as our Talk Chemistry forum with 3500+ members.

   We are building on our current offering to make educational research useful to teachers, including expanding our projects in this area. It is important to understand the barriers faced by teachers in accessing educational research and not to be unfairly critical of the teaching profession. We would be happy to talk further to the Royal Society about our work in this area and how this relates to this project.

4. Are there demonstrations of effective links between practitioners, policy-makers and researchers in this country, or internationally, that the Working Group should be aware of?
   There are different methods for bridging the gap between practitioners, policy-makers and researchers. A variety of media are being used to effectively bridge this gap including YouTube, podcasts, twitter, websites/blogs, MOOCs.

   The Royal Society of Chemistry acts as a link between practitioners, policy-makers and research in the UK via various activities. Chemistry Education Research and Practice links practitioners and research internationally. Education in Chemistry raises awareness of UK education policy and translates educational research (see question 3 for more detail).

   Some examples of how different media are currently being used to bridge the gap, that we are aware of, include:
   - MICER journal club (https://micerportal.wordpress.com/2016/05/26/micer-journal-club-1/).
   - the hashtag #chemed on twitter
   - The Learning Scientists (https://www.youtube.com/channel/UCjbAmxL6GZXiaoXuNE7cIYg);
   - Visions of Education (https://visionsofed.com/);

   The above examples illustrate how different media are being used but we do not necessarily endorse them as the most effective examples.

[77] Support from senior leaders 'crucial' to getting teachers to engage with research, Education Endowment Foundation (2016) http://bit.ly/28Mquzq
[78] Why don't teachers use education research in teaching, EiC (2016) http://rsc.li/2cpdAsf

International conferences can also aim to bridge the gap. Chemistry specific examples include the International Conference on Chemistry Education, European Conference on Research in Chemistry Education and EuroVariety in Chemistry Education.

School of Education, Communication and Society – King's College London

Research in the School of Education, Communication and Society (ECS) is interdisciplinary and international in scope with particular strengths in applied philosophy and ethics, applied linguistics and sociology and social policy. It is organised around three major research groupings:

Centre for Research in Education in Science, Technology, Engineering and Mathematics (CRESTEM) Research programmes: (i) curriculum, pedagogy and assessment; (ii) aspirations, attitudes and participation; (iii) learning in formal and informal contexts.

Centre for Language, Discourse and Communication (LDC) Research programmes: (i) language and literacy education; (ii) language and discourse in professional and public contexts; (iii) descriptive and comparative linguistics.

Centre for Public Policy Research (CPPR) Research programmes: (i) public service restructuring; (ii) professional knowledge and development; (iii) professional values and ethics; (iv) equality and social justice.

The key mechanisms that support research career development and research strength in ECS include:

- A strong infrastructure to support research, with all staff members affiliated to at least one of our three research centres, research centres supporting academic life and development within the School and dedicated professional staff within the School, Faculty and College;
- A pro-active research mentoring scheme with all staff having an identified mentor, with whom they are encouraged to keep in touch on a regular basis, and with a minimum entitlement to at least termly mentoring meetings;
- Developmental resources such as seedcorn funding and sabbaticals, and School- and Faculty-wide training and development opportunities, and an on-going series of writing workshops for early career colleagues;
- Recent initiatives such as a Policy and Practice Expert Panel that contributes to the dissemination and impact of our research at all stages of development.

Our understanding of educational research is as a broad set of knowledge-creating practices that address key educational questions and interests. These questions and interests arise out of a focus on the social, cultural, political-economic and linguistic dimensions of education in its broadest sense (e.g. education in the workplace, museums and the community, youth work, science and health communication, language and human development, as well as school, College and higher education).

As a School of Education, Communication and Society within a large, comprehensive and research-intensive university, we would like some thought to be given to supporting and protecting the breadth of education-related research, including some counterbalancing to the current orthodoxies of what counts as good research/evidence in officially sanctioned discourses. We believe that, nationally, the current, rather narrow focus in some quarters on an instrumental 'what works' agenda places us in an unfavourable position internationally where more diverse traditions of educational research continue to thrive. There are at least two unintended consequences of this narrow agenda that are of particular concern: first, the short-termism suggested by conceptualizing a research problem as something that can be subject to a 'quick fix' with a rapid move to identifying the next 'problem'; second, the implication that deciding 'what works' can be calculated in the specialized and controlled environments of experiments and then delivered to the teaching profession as 'end-users'. A related concern is the decline in research activity that investigates teaching as a culturally and societally significant activity as opposed to, for example, a delivery mechanism of the treatment with the largest effect size.

Supporting and protecting – and indeed stimulating the further development of – the breadth of traditions of education-related research would need to include:

1. Supporting the historical traditions of research on teaching informed by a wide range of social science and humanities interests – research on teaching that connects pedagogic activity to the development of society and culture as well as individual learning;
2. Partnering with and empowering teachers and other educators to be co-producers and independent producers of a range of scholarship that builds on their professional and academic interests and energies;
3. Generally broadening and enriching the community of researchers and research informed-actors but in ways that don't position practitioners as recipients of gobbets of findings or conclusions;
4. Stimulating dialogue between multiple paradigms including randomized controlled trials but also ethnographic, qualitative, discourse analytic, and critical approaches as well as philosophical traditions of scholarly argument;
5. Accepting that, within the context of educational research, distinctions between 'basic' and 'applied' research can be unhelpful and can put barriers in the way of realizing the goals of our previous four points.

Within our School, we already have excellent examples of links between researchers, policy- makers and practitioners and some of these can be viewed in the Impact Case Studies for REF 2014 that are available on the HEFCE website. In addition, Aspires/Aspires2, Enterprising Science and TISME (a targeted initiative on science and mathematics education funded by the ESRC and coordinated by Prof Louise Archer) are all good examples of research that have substantially changed policy discourse and practice across policy and practice across science, mathematics and engineering education. Another project (Relating Research to Practice) involving Dr Heather King has led to the development of a resource for practitioners now taken over by CAISE, a US government quango advocating for informal science education. Overall, King's research programmes exemplify some 'good practices' for generating impact that could be shared; for example, building-in pathways to genuine impact from the outset in collaboration with research participants as co-researchers (e.g. citizen science-like activities) as well as regarding them as 'end-users'.

Official conceptions and evaluations of 'impact' do not always have a realistic understanding of what is involved (and what can/cannot be planned for) in understanding the relationship between the creation of new knowledge through research, the development and enactment of policy and the unpredictable 'mangle of practice' in professional/practice settings. This problem has become more visible in recent years, during what some have started to refer to as a period of 'evidence-resistant policy.' At one level, impact requires time and funding – and the funding also needs to be flexible enough to respond to changes in the policy landscape over the funded period as well as to unexpected opportunities that emerge in the course of the research. At another level, in an environment where professional practice (e.g. school teaching) is so strongly framed by policy at a deep structural level, the opportunities for creative, unusual or risky high quality research to have an impact are limited (it is no surprise that in this kind of environment, institutions and people can be risk-averse).

Our priorities when thinking about how the contexts for educational research may be improved include:

1. Intellectually, encouraging funders to take a broader and more holistic view of education and educational research that re-connects current and future activities to the strong historical and international traditions of educational research and scholarship. Although there are notable exceptions, we believe that funded British educational research risks becoming narrower in scope and interests and methods. Internationally, we believe this move potentially makes British educational research much less interesting and, given UK educational research's contribution to the economy according to the former DBIS, less competitive.

2. Structurally in terms of funding regimes, arguing for greater flexibility in the mechanical aspects of governing funded educational research that would allow for greater responsiveness to opportunities and ideas that emerge in the course of funded projects. Currently creativity and ambition are often hampered a) by the degree of specificity required in funding applications that can seem to require the 'answers' to be detailed before the work is done (in turn potentially limiting the significance of the inquiry) and b) by the lack of flexibility within budgets and financial arrangements to move funds around according to the needs of the project as they emerge. We believe that greater flexibility within the structures of funding would result in even higher quality and more ambitious research.
3. Methodologically, strongly suggesting that the 'unit' we need to work from at researchers is at the level of the individual within socioculturally-situated relationships rather than operating at a blanket class (one-size-fits-all) level. This position reflects our own work on various social justice related initiatives, but also the research community's ongoing and historical work around, for example, socialisation, classroom communication, cognitive development or even argumentation.
4. Looking to the future, recognizing that learning is an ecosystem, and therefore that educational 'bodies' need to work together more collaboratively. Such bodies include schools, but also out-of-school providers, youth organisations, community groups, and so on. We see this more expansive and ecological view of learning and human development as being critical to the more holistic view of education and educational research we proposed in our first priority.

Our comments above indicate some of the barriers to the realisation of improvements in the contexts for educational research. Another potentially significant potential barrier relates to the Higher Education Bill currently before parliament. Specifically, we are concerned about the proposal to create a monolithic 'UK Research and Innovation' body with extraordinary powers vested in the Chair and Chief Executive and the withering away of the current research councils to become mere committees. In our view, this new arrangement would present a serious threat to the diversity of educational research in the UK as well as to the field's responsiveness to society and its broader democratic accountability. In the context of the recent referendum decision that the UK should leave the EU (with all the potential consequences both for research funding and staff/student mobility), the Higher Education Bill is a significant cause for concern.

We believe there are opportunities for the growth and enhancement of educational research. One example of a promising future direction is the establishment of an independent College of Teaching with a specific brief to develop a research-engaged teaching profession. Another would be the opportunities for educational researchers to contribute to large, transdisciplinary research programmes that address the significant global challenges of development. Overall, however, we believe that, at the level of policy, the conditions for educational research in the UK are at a critical juncture and we welcome the opportunity to respond to this joint Royal Society-British Academy initiative.

Society for Educational Studies

Contribution of the field to educational research, policy, teaching and learning, and society

The field of educational studies has made significant contributions to educational research, policy, teaching and learning, and society. This contribution has been wide ranging, and has included:

- philosophical/conceptual analysis of central educational ideas and processes;
- the development and refinement of new analytical tools and methods for exploring and understanding educational theories, policies, curricular and practices;
- detailed empirical research investigating, highlighting and reporting on educational practices in the United Kingdom and overseas.

In the past 10 years the field of educational studies has made many significant contributions in each of the areas above.

There are too many examples to list meaningfully in the Society's response, but a recent study and report funded by the Society for Educational Studies provides an indicative example. In 2013, following a competitive tender, the Society funded a two-year national research project entitled *Race, Racism and Education: inequality, resilience and reform in policy & practice*, conducted by David Gillborn, Nicola Rollock, Paul Warmington & Sean Demack, from the Centre for Research in Race and Education, University of Birmingham.

The funding of the project marked the 20th anniversary of the racist murder of Stephen Lawrence, an event that is frequently viewed as a landmark in British race relations. Following years of campaigning for an official inquiry into the police's handling of the investigation, the publication of *the Stephen Lawrence Inquiry Report* (Macpherson 1999), and the subsequent Race Relations (Amendment) Act 2000 (RRAA), represented a high point in policy discussions of 'race' and racism in the UK. Opinion is divided about the long-term effects of the Lawrence case and its legislative consequences. Speaking on the 20th anniversary of Stephen's murder the prime minister, David Cameron, hailed 'monumental change in our society' but race equality campaigners – including Stephen's mother Doreen Lawrence – have been much more circumspect. The research project, which uses a mixed method approach to explore the changing landscape of race and education in England, is the most comprehensive investigation into the state of race equality in the English education system during the twenty years following Stephen's murder in 1993. The full report can be read at http://www.soc-for-ed-studies.org.uk/documents/GillbornD-et-al_Race-Racism-and-Education.pdf.

What are the priorities in your field of educational research, and what is driving these
Educational studies is a broad field, which comprises a wide range of approaches, foci and interests. As such, there are numerous priorities within each which it would not be appropriate to list in detail here. If look across the field of educational studies generally it is clear that the priority remains understanding and challenging the continued presence of social injustices within education systems and society more generally. The key priority for educational studies continues to be to understand the nature of social injustices (why and how these manifest; their long-term and immediate causes and instantiations; how notions of social justice/injustice are rendered and challenged in educational theory, policy, curricular and practices). Crucial in this work is the need to identify and report on what have been generally termed 'sites of hope': those educational settings in which social injustices are challenged in important ways. Such sites remind us of the importance of contextual concerns (in the face of often decontextualized education policies), and of particular, localised responses to these contexts.

What particular barriers and challenges are there to conducting educational research and how might these be overcome?
The most commonly felt barrier or challenge to conducting educational research in the current UK climate is the availability of research funds. It is the Society's view that while the funding context for educational research is more challenging than, for example, was the case ten years ago, funds remain available for well-conceived, appropriately framed (for example, collaborative, international, interdisciplinary) research. In making this comment, we would though wish to press the importance of ensuring that research funding is readily available for those at an early stage of their research career. Funding for early career research is crucial in order to build research capacity for the future.

The Society is also mindful of the impact (both positive and negative) on educational research of the Research Excellence Framework. The recent findings of the Stern Review are both interesting and are largely to be welcomed. For example, if adopted, adjustments to the number of outputs per researcher and reframing the connection between research outputs and impact should serve to respond more aptly to the actual conduct of research.

How does the Society disseminate research?
The Society disseminates research through two three main mechanisms: (i) its journal, the *British Journal of Educational Studies*; (ii) its website (http://www.soc-for-ed-studies.org.uk/); and, (iii) through its annual seminar and annual seminar series. At the time of the call for views, the Society is reviewing its research dissemination strategy.

Are there demonstrations of effective links between educational researchers, policy-makers and practitioners in this country, or internationally, that the Working Group should be aware?
As with previous questions, there are a number of such demonstrations within the field of educational studies, but one illustrates such connections very well. This is the work of the Jubilee Centre for Character and Virtues at the University of Birmingham.

UCL Institute of Education

Summary

- The IOE has a longstanding commitment to research engagement and impact among policy and practitioner audiences and the wider public. It has made related investments in communications, policy and public affairs, and impact curation. This has subsequently been reinforced by associated shifts in the funding environment.
- The IOE has long been engaged in interdisciplinary research, which it has supported through partnerships, research centres and 'Special Interest Groups'. Cross-disciplinary inquiry is a strategic priority for UCL, with which the IOE merged in 2014. UCL uses seed funding and networking to build collaboration across faculties. Beyond the university, structural factors continue to inhibit such research.
- The IOE uses a range of channels to communicate its research activity and its findings – from media work, to social media, newsletters, research brochures, events, research briefings, advisory roles, input to public consultations, secondments, MOOCs. Ongoing engagement with research users, throughout the research process, underpins IOE research and its dissemination.
- Priorities for the IOE's research activity over the next five years include: collaboration with peer institutions around the world; cross-disciplinary research; methodological innovation; further strengthening its work in longitudinal and cohort study research; work at the interface between education and professional disciplines; strengthening the links between research and its teacher education provision; greater use of exchanges and secondments across academic, policy and practitioner communities; serving as a hub for informed public debate on issues in education. Much of this will require investments that cut across disciplinary boundaries.
- Research that utilises administrative data is clearly a significant area for growth for education research. The ability of researchers to access those data and to link them to survey data will be crucial to realising that potential. Digital technology in education is a further area for development; to date this research has been a major beneficiary of EU research funding.
- We list a selection of examples of effective links between IOE researchers and policy-makers and practitioners. These have variously highlighted the value of: mixed methods research; close and responsive engagement with stakeholders throughout the research process and reciprocal relationships; working with third party 'influencers'; and capacity building among research users.
- The call for evidence does not indicate what form the review team believe the relationship between (education) research and policy/practice *should* take. We would emphasise the typically indirect nature of the relationship, and the potential for all kinds of research, including curiosity driven research, to influence policy thinking. A broad church of education research – one that asks fundamental questions as well as that which addresses issues framed by current policy – will best serve policy, practice and public debate.

Questions for university management

1. What grouping best describes your institution?

   Russell Group.

2. How do you support educational research in your institution? How has the level of this support changed over the past 10 years (e.g. particular investments in staffing and training and development), and why?

Over the past decade, the main additions the IOE has made to its capacity to support research have been in the area of research impact and public engagement. This included a four-year senior appointment to champion research impact, as well as ongoing capacity to advise researchers on engaging with policy and practitioner audiences, and on public engagement with research. These latter colleagues monitor policy developments and knowledge transfer opportunities, support research-related communications, co-ordinate cross-IOE responses to public consultations, and facilitate links between policy-makers and IOE staff – and offer related staff development opportunities. These additions stemmed from the IOE's existing commitment to impact and engagement (see below), but also responded to the impetus provided by the inclusion of 'impact' in the 2014 REF, as well as wider shifts in funder priorities. Earlier related investments have included:

- ***Communications.*** In 2012 the IOE established the IOE Blog[79] and invested in the post of Blog Editor. The blog provides a forum for IOE commentary on issues in education and related fields. Its posts are frequently picked up by the mainstream media and directly by policy-makers and practitioners themselves.
- ***Public engagement.*** In 2012 the IOE was successful in its RCUK Catalyst project bid, selected as one of eight universities to provide a model of public engagement within UK higher education. It supported a programme of leadership, training, learning and evaluation. In partnership with the National Co-ordinating Centre for Public Engagement it has established a new open access journal, *Research for All*, concerned with public engagement in research, focusing on inquiry that involves universities and communities, services or industries working together. The first issue will be available from January 2017.
- ***Open access.*** In 2007, the IOE launched its institutional repository, Eprints, to enable academic staff to make their research outputs freely available over the web via a searchable database. It shifted to electronic submission of the final version of doctoral theses so that these could be made available through Eprints. RCUK policy on open access has cemented this direction of travel. Since merger with UCL, IOE authors make their papers available through UCL Discovery. This is UCL's **open access repository,** and the system through which the university meets the requirements of the REF open access policy.

3. Have you observed that educational research is becoming more interdisciplinary (please provide details) and, if so, how are you accommodating this?

   Regardless of external trends, it is a strategic priority for our university to build its cross-disciplinary research, with the aim of better addressing the 'grand challenges' facing society. The university is using seed funding and networking to build links and collaborations that can support interdisciplinary research projects and programmes between IOE colleagues and those elsewhere in UCL. IOE colleagues participate in each of the university's Grand Challenge working groups, which are also promoting cross-disciplinary collaboration with external stakeholders.

   Prior to merger with UCL, the IOE had taken forward several collaborations that have supported leading-edge interdisciplinary research. For example, in 2007 the IOE established the London International Development Centre (LIDC), with Birkbeck, London School of Hygiene and Tropical Medicine (LSHTM), Royal Veterinary College, and School of Oriental and African Studies (SOAS). The LIDC has developed new interdisciplinary research and training programmes to address complex challenges, including tackling HIV/AIDS and climate change. The IOE's London Knowledge Lab, a collaboration with the Department of Computer Science at Birkbeck, 2005-15, was at the forefront of promoting the effective application of digital technologies in education in its broadest sense, across classroom settings, and, for example, operating theatres, and outreach

[79] https://ioelondonblog.wordpress.com/

healthcare in developing countries. This work continues within the IOE and UCL. The IOE led the interdisciplinary ESRC Bloomsbury Doctoral Training Centre, with Birkbeck, LSHTM and SOAS. Our new ESRC Doctoral Training Partnership includes these same partners and the University of East London.

Within the IOE alone, research encompasses all aspects and stages of formal and informal education – from early years, through further and higher education – as well as the related areas of children and families, health and well-being and international development. In particular, the IOE has strong disciplinary traditions (history, philosophy, psychology, sociology) that it retains, but layered over these are its many research centres and Special Interest Groups, which facilitate new ways of thinking about the disciplines and cultivate linkages across them. In these respects the IOE articulates a particularly strong social scientific conception of education, and is distinctive in bringing a broader social science perspective to education research and teaching. This enables strong synergies to emerge between education and other areas of social science – at a time when, internationally, significant advances in research and practice in education are being secured precisely through enquiry across the social sciences. This is particularly so across education, economics and social policy.

Barriers remain,[80] including questions as to whether the REF process truly accommodates interdisciplinary research. The feedback from HEFCE on REF2014 was that more interdisciplinary research was submitted than was recognised as such by universities, which suggests universities are nervous about how such research will be treated. There is general recognise that the Stern Review recommendations go some way to addressing these particular barriers.

4. Through what mechanisms do you disseminate the educational research your institution undertakes?

Alongside traditional academic publishing routes the IOE uses a range of communications channels to disseminate information about and the findings of its research. These include: **press releases**, **website news stories and features**, **'IOE in the news' web pages summarising press coverage of its research**, **social media** (primarily Twitter, Facebook), **blogs** (the IOE's own blog, plus *The Conversation*, etc), and **IOE-run events**. IOE colleagues are frequently speakers at **external events** on issues of policy and practice. It encourages and supports individual academics and centres to build and engage with their immediate networks directly (e.g. through briefing notes, etc).

The IOE works with the **Education Media Centre** to promote the findings of significant (and newsworthy) research studies (e.g. analysis of England's performance in the OECD's PISA). It produces an **annual research brochure**[81] and a **bi-monthly newsletter** highlighting its latest research, which is circulated to policy and practitioner audiences.

It has produced **research briefings**, summarising the main findings of its research projects. Some centres at the IOE have their own communications teams, managing communications across press releases, social media, and events. Specialist research centre webpages, communications and event programmes enable more targeted interaction with stakeholders. **The work of these centres in particular exemplifies the importance of building sustained engagement with research users to underpin dissemination and enable impact** (something that is reflected in individual research projects across the IOE). To provide an example, note the public engagement activity within the IOE's Centre for Research in Autism and Education (CRAE):

[80] See, for example, https://campaignforsocialscience.org.uk/news/social-scientists-discuss-challenges-opportunities-interdisciplinary-research/
[81] http://www.ucl.ac.uk/ioe/research/pdf/IOE-Research-2015-2016-Brochure

- Brain Detectives. These ever-popular free half-day sessions allow children and young people to learn about how the brain works and take part in CRAE research. Designed to foster an interest in science and brain science in particular, there is a strand for those aged 6-11 and for those aged 12-18. Through the tasks that they complete, the young people are also taking part in CRAE research on how children see and think about the world around them.
- Annual Christmas card competition for young people with autism who are involved with CRAE.
- Public engagement activity at high profile national and international events – e.g. the Green Man Festival (2016).
- Annual lectures and events series.
- Film preview screenings of new releases relevant to autism – e.g. *X+Y* (2015).
- Mini guides – accessible briefing notes on research findings.
- Active social media – see website and Twitter account.
- Input to the IOE's Initial Teacher Training provision, reaching the next generation of teachers.
- Placements for work experience and undergraduate students.
- Engagement with policy-makers and third sector projects – for example, through membership of the Westminster Commission on Autism, a cross-party, cross-sector group of Parliamentarians, autistic people, parents/carers, charities, academics and health professionals, and the National Autism Project.

Where relevant, the IOE includes reference to the findings of IOE research in faculty-level **submissions to public consultations and parliamentary inquiries, etc**. At the same time it works with UCL's Public Policy team to ensure that findings from the IOE's educational research feed in, as appropriate, to UCL level responses to public consultations across a range of government departments. Again, the IOE encourages and supports individual researchers to engage directly with these processes.

All these communications are supported by **general networking** with policy-makers and policy 'influences', at faculty and individual researcher level.

Many projects, especially larger projects, and all research centres, will have **advisory boards**, the members of which will be an important point of reference and also support the dissemination of findings through their own networks.

The IOE also shares its research expertise through:

- **Public commentary/advice** – the majority of the IOE's senior academic staff regularly provide advice to the media and external organisations, national and international, based on their research expertise.
- **Secondments** – to charities, think tanks, government departments, parliamentary committees, national and international.
- **Pro bono work** – this includes informal advice on research to organisations such as schools, Local Authorities, and Health and Wellbeing Boards.
- **Hosting overseas visits** from ministries of education and universities.
- **MOOCs** – the IOE's MOOC 'What future for education?' used a range of 'everyday' questions about education to interview colleagues about their work and how it answers those questions. The MOOC attracted over 13,000 participants.

5. During the next three years, do you expect to invest more or less in supporting educational research? Why is this so?

   The IOE is ambitious to grow its educational research, to the benefit of external stakeholders and to UCL's ethos of addressing societal challenges. Over the next five years we expect:

   - That a much greater proportion of the IOE's research will be conducted in partnership with peer institutions around the world, responding to international research and development challenges.
   - That much more of its research will cross disciplinary boundaries, and across a broader terrain – in the first instance making the most of links with faculties across UCL.
   - To build on its excellence in methodological innovation and diversity, particularly in relation to approaches combining quantitative and qualitative methods.
   - To utilise the opportunities that digital technology offers for new avenues in educational research and impact.
   - To conduct more work at the interface between education and the professional disciplines represented by other faculties (our new Centre for Engineering Education is an early example).
   - To strengthen the links between IOE research, the wider research base and its teacher education provision.
   - To make greater use of exchanges and secondments, through which the boundaries between IOE academics and policy and practitioner audiences will be much more porous.
   - To build the IOE as the centre for informed and authoritative debate on issues in and next generation challenges for education.

   In many cases this will require continued investment in global engagement and interdisciplinary research, which cuts across disciplinary boundaries.
   With regard to research impact specifically, a general theme within the higher education sector is the need to improve co-ordination across communications, policy and public affairs, public engagement and impact curation teams.

We would also like to take the opportunity to respond to some of the questions the call for submissions poses to other respondents:

In the past 10 years, what would you judge as the most significant contributions your field has made?

Below we pick out a selection of areas in which IOE academics have made a recent and major contribution to educational research and within their particular fields.

- **Building a new discipline – educational neuroscience.** Our Centre for Educational Neuroscience (CEN), a collaboration with Birkbeck, has brought together colleagues in neuroscience, child development, psychology and education to build a new scientific community and a new discipline of educational neuroscience. The centre is committed to translating research into practice for those wanting to bridge the gap between the biological basis of learning and the delivery of education in the classroom. CEN's critical mass of researchers focused on science learning is unique worldwide. It is developing new ways of integrating behavioural and neuroimaging data, which has led to new models of the relationship between tacit and explicit knowledge in learning (IOE lead: Andy Tolmie).
- **Innovation in longitudinal cohort study research.** The IOE is home to three of the national birth cohort studies, based within the Centre for Longitudinal Studies (CLS):[82] the 1958 National Child Development Study (NCDS), 1970 Birth Cohort Study (BCS70), and

[82] http://www.cls.ioe.ac.uk/

Millennium Cohort Study (MCS). It also hosts the 'Next Steps' cohort study. In addition, it hosts the Cohorts and Longitudinal Studies Enhancement Resources programme (CLOSER), which launched in 2012 as a collaboration with the British Library and UK Data Service.[83] CLOSER brings together eight leading longitudinal studies and is working to maximise their use, value and impact, both at home and abroad. Its work focuses particularly on cross-study comparisons and survey and administrative data linkage. The CLS studies are a major resource for educational and social science researchers around the world. The IOE's stewardship of these studies is also emulated nationally and internationally in other longitudinal studies – for example, the IOE's methodological innovation (e.g. introduction of online/smartphone app time-use diaries, accelerometers, and saliva sample collection for DNA), as well as the team's work to support participant engagement and retention. Research publications from the IOE alone that utilise cohort study data cover topics ranging from early childcare and development and generational belonging to sophisticated cross-cohort study of cognitive ability in early and adult life (IOE leads: Alissa Goodman, Alison Park).

- **Methodological development**. Since 2005, the IOE has hosted four ESRC National Centre for Research Methods nodes out of a total of 19 nationally.
    - The Methods for Research Synthesis Programme (2005-08) developed methods for synthesising the results of all types of research with a view to supporting robust evidence for decision-making (IOE lead: David Gough).
    - ADMIN (Administrative Data – Methods, Inference and Networks) (2008-11) developed a set of statistical frameworks for combining data from different sources, which was a vital first step in facilitating the use of 'big data' in social science, including in educational research (IOE lead: Lorraine Dearden). Colleagues are partners in the new ESRC-funded Administrative Data Research Centre for England.
    - MODE (Multimodal Methodologies for Researching Digital Data and Environments) (2011-14) developed systematic ways to investigate representation and communication in digital environments, building on ground-breaking work by IOE colleagues in the 1980s and '90s on social semiotics, with many applications in relation to education (IOE lead: Carey Jewitt).
    - NOVELLA (Narratives of Varied Everyday Lives and Linked Approaches), also 2011-14, used participatory and narrative methods to examine the 'disconnect' between behaviour and constructed meaning and get beneath the difficulty of changing habitual practices (IOE lead: Ann Phoenix).
- **Quantitative analysis.** The IOE is the major UK centre for the quantitative analysis of education data – for England, the UK and advanced industrialised countries in general. This expertise provides the basis for its involvement in the Nuffield Foundation's Q-Step programme designed to build capacity in quantitative social science.[84] Research outputs include innovative work linking, variously, data from the Higher Education Statistics Agency, National Pupil Database and School Workforce Census, and from international education tests such as the OECD's PISA, to address a range of substantive and methodological issues (e.g. school choice, widening participation, and survey response).[85]
- **Relationships between economic competitiveness, social cohesion and the non-economic benefits of education.** A major development has been the establishment, in 2008, of the IOE's Centre for Learning and Life Chances in Knowledge Economies and Societies (LLAKES) (IOE lead: Andy Green).[86] LLAKES was the first ESRC Research Centre specifically for research on

[83] http://www.closer.ac.uk/
[84] http://www.ucl.ac.uk/q-step
[85] See http://www.ucl.ac.uk/ioe/departments-centres/centres/quantitative-social-science
[86] http://www.llakes.ac.uk/

education and was awarded a further five years of funding from 2013. The centre's key research themes are

(i) the social and cultural foundations of learning, knowledge production and transfer, and innovation within a changing economy, and
(ii) the effects of knowledge and skill distribution on income equality, social cohesion and competitiveness.

Insights include the complex relationship between classroom diversity and civic attitudes of tolerance, trust and participation; LLAKES research has also provided the first integrated, multidisciplinary framework for understanding skills and skilled work in modern society, making the case for the recognition of a sub-discipline of skills studies (IOE lead: Francis Green).

- **The role of education in society.** Led by Stephen Ball, IOE research has spearheaded examination of contemporary changes in educational governance, particularly the growing role of business and philanthropy in new policy networks.[87]
- **Understanding typical and atypical development and its implications for learning.** The aforementioned Centre for Research in Autism and Education (CRAE) is focused on identifying effective interventions for those with autism (IOE lead: Liz Pellicano).[88] It has provided the basis for arguably the most coherent account of autism yet, helping to explain its genetic, neural, behavioural and social characteristics. This and wider research at the IOE on atypical development has provided important insights for pedagogy.
- **Understanding of the significance of new technologies for education**. IOE research includes foundational, interdisciplinary work on human-computer interaction and adaptive technologies for learning; the opportunities and pedagogical challenges afforded by collaborative technologies, including for teacher professional development; and the re-design of learning in technology-rich environments. IOE colleagues have developed original theories of mobile learning and addressed its application to the mainstream classroom, work-based learning, for learners on the autistic spectrum, and for learners in developing countries.[89]
- **Pedagogical innovation.** The IOE's subject-based studies include, for example, the development of state-of-the-art technologies in collaboration with schools to enhance the teaching and learning of mathematics, and a study of the use of mathematics in the workplace that has introduced the important concept of 'techno-mathematics' (Celia Hoyles). More generally, IOE colleagues are engaged in a number of RCT and intervention-based studies funded by the Education Endowment Foundation (EEF), including 'best practice in grouping students' (Becky Francis).[90] They are closely engaged with the EEF's new focus on how to engage practitioners with research evidence and adapt their beliefs and assumptions as new evidence becomes available (see the commentary below on 'Research Learning Communities').

What barriers and challenges do you face in undertaking education research, and what changes might help overcome these?

A significant area of growth for education research is research that utilises administrative data. However, the potential that such research offers for understanding and improving the operation of the education system and related policy areas is facilitated/circumscribed by the degree of freedom researchers have to link different kinds of administrative data, or to link administrative data to survey data. Although access to education records (such as the National Pupil Database) has to date been relatively straightforward, linkage to other administrative data of relevance to education (for example, relating to health or social background) is far more challenging. This impedes the potential use of administrative data for education research. The aforementioned CLOSER team has been engaged in

[87] See http://www.ucl.ac.uk/ioe/departments-centres/centres/centre-for-critical-education-policy-studies
[88] http://crae.ioe.ac.uk/
[89] https://www.ucl.ac.uk/ioe/departments-centres/centres/ucl-knowledge-lab
[90] https://www.ucl.ac.uk/ioe/departments-centres/centres/groupingstudents

a range of activities promoting the importance of survey and administrative data linkage (e.g. in relation to the Digital Economy Bill).

Particularly in relation to research on digital technology in education, there are concerns that loss of access to EU research funding streams would significantly impinge on UK activity in this field. The IOE's experience to date has been that EU research funding is often less risk averse than other sources. A related feature of EU research funding has been that it funds *design research* – in this instance, design research around using digital technologies for particular learning objectives. The IOE's experience is also that EU funding sources tend to be more understanding of interdisciplinary research.

To take the particular example of AI, much of the recent funding for education research concerning AI has come from the EU. This is because the work requires a combination of technology innovation and educational innovation, and Research Councils UK has not funded this particular type of interdisciplinary research. Without EU funding the UK risks losing competitiveness and international standing in this field, as well as losing out on the potential of deploying technology to develop a more productive workforce.

Questions for subject associations

Are there demonstrations of effective links between educational researchers, policy-makers and practitioners in this country, or internationally, that the Working Group should be aware of?

In the 2008 Research Assessment Exercise the IOE was commended for its "wider public role, as well as the evidence of [its] impact on policy and practice". In the 2014 REF – in which research impact became a measure for the first time – the IOE was again recognised for its performance. The IOE was able to submit no fewer than 23 impact case studies; these encompassed impacts across fields such as enhancing the contribution that teaching assistants make to pupils' learning, facilitating girls' access to education across Africa, shaping national guidance on developing children's literacy and verbal communication, and influencing the government's apprenticeship programme. This impact has been achieved through high quality research combined with strong links across the IOE with external audiences, national and international, and an extensive contribution, through the media and advisory roles, to national debate.

Below we pick out a selection of examples.

Policy impact

The **Effective Pre-School, Primary and Secondary Education (EPPSE) study** (1996-2013, with Oxford University and Birkbeck) has been a 'stand-out' study in terms of its influence on education and social policy, and is being replicated in other countries. The study provided the first robust evidence in the UK of the positive and enduring benefits of high quality pre-school provision and its ability to ameliorate some effects of social disadvantage; it significantly advanced understanding of the relationships between the curriculum, pedagogy and progression in the early years and beyond. The role of 'sustained shared thinking' between teacher and learner in marking out high quality pre-school provision has been widely picked up by both researchers and practitioners. In England alone the study underpinned a significant and sustained shift in emphasis to investment in early years, and has influenced policy and spending, curriculum design, service delivery, and professional practice. The extent of the study's influence is testament to the team's approach throughout – communicating findings effectively and engaging closely and responsively with policy-makers, practitioners, early years providers, schools, and parent groups. That is why the study is often held up as an exemplar of what can be achieved through research connected to policy concerns, and these researchers have worked extensively with the research community to share their experience. The study's combination

of largescale quantitative analysis and qualitative research is also regarded as a factor in its influence (IOE lead: Iram Siraj).[91]

A recent, smaller scale example is provided by IOE research into **teachers' and parents' responses to the introduction of Baseline Assessment in primary schools**. Conducted in partnership with the NUT and ATL, the project gathered significant press attention and contributed to the reversal of this policy in April 2016. This research won the national BERA-SAGE award for 2016 for its impact on policy. The project demonstrated how partnership with third sector organisations can be helpful in raising the profile of research and supporting engagement with relevant stakeholders (Guy Roberts-Holmes, Alice Bradbury).

From 2000, the IOE's **Thomas Coram Research Unit (TCRU)[92]** innovated a new approach to providing research evidence for policy-makers – through its 'rapid response' work in the field of children and families research. This model of providing ongoing quick-response research support built relationships of trust and mutual understanding between the two parties. It raised policy-makers' expectations regarding the value of research evidence in policy-making, and encouraged joined-up research agendas across the government departments concerned – Education and Health. Resource for rapid response work has since been included in specifications for all Policy Research Programme centres at these departments: the DfE-funded Childhood Wellbeing Research Centre (2010-14, based at the IOE, with the Universities of Kent and Loughborough) was itself a reflection of the rapid response legacy.

The IOE's **Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre)**[93] has pioneered the use of systematic review (robust summaries of the existing evidence base) beyond the medical field, across public health, education and international development. In particular, it has developed methodologies for the synthesis of qualitative research and mixed-method reviews. Through its own reviews the centre has influenced policy deliberation on topics such as education for smoking cessation in pregnancy. Alongside, the centre has worked with governments across the EU in building capacity in systematic review, to inform policy and practice. It built 'EPPI-Reviewer', a state-of-the-art web application incorporating new data mining tools, for managing reviews and analysing the results. It works extensively across the network of What Works centres. It is one of only a few centres internationally developing the study of research use and impact (IOE lead: David Gough).

Practitioner engagement

Informing the deployment of teaching assistants. In 2015 IOE colleagues worked in partnership with the Education Endowment Foundation (EEF) to publish guidance on the effective deployment of teaching assistants (IOE lead: Peter Blatchford). The guidance is designed to help school leaders make sense of, and act on, the IOE's extensive research evidence on the role of teaching assistants and, in particular, the surprising finding of the negative effects of deploying untrained teaching assistants to support learners with special needs. This represents the culmination of three significant funded research projects[94] and sits alongside the team's existing work with schools to enhance the contribution that teaching assistants make to pupils' learning.[95] As well as helping to shape schools' practice directly, the research has informed Local Authority guidance, guidance from the then Training and Development Agency for Schools and, more recently, OFSTED inspection frameworks. It has also been cited in the Lamb inquiry and SEN specialist frameworks. The guidance is now part of the EEF's first ever trial of a whole school intervention.[96]

[91] https://www.ucl.ac.uk/ioe/research/featured-research/effective-pre-school-primary-secondary-education-project
[92] http://www.ucl.ac.uk/ioe/departments-centres/centres/thomas-coram-research-unit
[93] https://eppi.ioe.ac.uk/cms/
[94] 2004-09 – Deployment and Impact of Support Staff (DISS) study (DCSF, Welsh Assembly Government); 2010-11 – Effective Deployment of Teaching Assistants (EDTA) study (Esmee Fairbairn Foundation); 2011-12 – Making a Statement (MaST) study (Nuffield Foundation).
[95] http://maximisingtas.co.uk/
[96] http://www.ucl.ac.uk/ioe/news-events/news-pub/oct-2016/ioe-collaboration-receives-eef-funding-to-unleash-the-potential-of-teaching-assistants

Embedding evidence-informed teaching. IOE research developed the concept of Research Learning Communities (RLCs) as a means to enable the implementation of evidence-informed practice at scale. They were designed to see how such practice could become not just a one-off feature of a particular group of enthusiasts in a school at any one time, but rather embedded as a continuing approach for teachers within and across schools. RLCs were initially trialled in some 55 primary schools in England, and have since been used by school communities and alliances across the country. The RCL approach emphasises the need for teachers to engage in a process of learning and accommodation, directed towards helping them make explicit connections between research evidence and their own assumptions and knowledge; it also highlights the importance of leadership and culture (IOE lead: Chris Brown).

Informing R&D in the digital learning technology industry. The IOE's Knowledge Lab has been at the forefront of bringing together academics, teachers and industry to debate and change education through the opportunities that new digital technologies provide. This is exemplified by the lab's 'What the Research Says' events. Colleagues present research evidence to those interested in the design and use of educational technology, as well as addressing issues of research design in this field. Now in their fourth year, these events have supported many new connections and collaborations across academia, schools and industry (IOE lead: Rose Luckin).

Beacon Schools in Holocaust education. The distinctive contribution of the IOE's Centre for Holocaust Education is in conducting large scale national research on classroom needs in relation to teaching and learning about the Holocaust, which then directly informs the development of educational approaches, activities and materials. More than 2,500 teachers and an estimated 1 million pupils have so far benefitted from this work. The centre's impact on the schools system in this regard is enhanced through its use of 'Beacon Schools' to support the sharing and cascading of good practice. The relationship is reciprocal: the Beacon Schools in turn bring the centre's work closer to the classroom, providing a route to trial new approaches, and feeding back issues to help frame new activity (IOE lead: Stuart Foster).[97]

Research capacity building in developing countries. Education and international development is a significant strand of the IOE's research. In addition to substantive impacts in areas ranging from schools policy to sanitation and policing, this research activity has also concerned itself with building local capacity in research methods. Examples include research in Myanmar, addressing the impact of military rule, economic stagnation and civil strife on education, particularly the parallel school systems for minority groups. Through this work IOE colleagues have provided training in research methods for more than 150 Myanmar students and academics. These students and researchers are now producing briefing materials that are being presented to Myanmar's president (Marie Lall). Economic research on school teacher effectiveness and school place allocation in India has similarly encompassed quantitative research methods and impact evaluation training for policy-makers (Geeta Kingdon). Elsewhere, higher education institutions in Mozambique have adopted the participatory pedagogies they saw IOE researchers use in workshops for a study to address violence against girls in education (Jenny Parkes).

Questions for Government and its agencies

Are there unexploited opportunities for educational research to inform policy?

Across disciplines and policy fields, the discussions as to what is impeding 'better' and more consistent use of research in policy typically identify the same issues of supply and demand: jargon-heavy publications; the absence of concise summaries; the lack of infrastructure for research translation (beyond the medical sciences); and the lack of access to journal publications among policy audiences. Incentives within academia (including national research assessment exercises) that do not reward efforts directed at research impact are also often picked out. On the demand

[97] http://www.holocausteducation.org.uk/

side, a poor grasp of science and statistics among politicians has been highlighted and remedies offered; meanwhile, the 'fact-checking' movement has sought to engender more responsible use of data in policy debate and reporting (e.g. www.fullfact.org).

As we have shown, engagement with policy and practitioner audiences and wider stakeholders runs through the IOE's research and is something that it has invested in on a sustained basis over many years, in the process addressing many of the barriers listed above. We would emphasise that this encompasses a broad church of educational research at the IOE, not just those studies that fit with some narrow conceptions of research that has utility to policy-makers or practitioners, such as RCT-based studies.

In framing the review and posing the specific question above, the British Academy and the Royal Society do not define how they see the relationship between (educational) research and policy, nor how they would like it to look. This reflects a wider lack of clarity in debates on this issue and about what, ultimately, is being advocated for. Among much advocacy, the implied goal is a 'golden age of empiricism', populated only by RCTs and systematic reviews, which should directly and consistently shape (education) policy or practice. In practice, the relationship between even these types of research and policy/practice is often indirect. Often, the relationship is more one of sensitising audiences to issues and considerations. It can be a means of exposing personal biases and prejudices, and accessing wider experience, as opposed to a direct guide to action. But all types of research can serve these functions. Recognising these aspects of the research-policy relationship – and their equal merit to a 'linear' model of direct impact – is important in terms of sustaining the spectrum of high quality educational research that can best serve policy and practitioner audiences and wider public debate.

A field defined too narrowly would provide a very limited evidence base for improving an education system and informing a teaching profession facing the challenges of a rapidly changing world, where what works today may not work tomorrow. It is important and even useful, therefore, for educational research to be able to ask other sorts of questions as well as 'what works', if only why something works and why it works in some contexts and not in others. It is also appropriate that policy debate should be informed by research that asks more fundamental questions and that questions prevailing assumptions, including about what a 'just' education involves. In this regard we hope that the review avoids perpetuating the notion implied in some debates that policy influence can only (and always will) be achieved through a narrow range of research. The relationship between research and policy is indirect and diffuse, and mediated by a host of other factors; we should not narrow the research base on a false prospectus.

It is notable that a more nuanced debate is now emerging among advocates of 'useful research' and evidence-informed policy/practice (debate that encompasses but is not restricted to the field of education). This concerns, for example:

- The difficulty of securing genuine and authentic engagement with evidence on the part of policy-makers, as well as, in this instance, schools and practitioners, facing an array of other pressures.
- How this agenda impacts on practitioners and the risk of building a compliance culture (exacerbated in the case of teaching by changes to initial training that reduce engagement with theory).
- The unintended consequences of this agenda in terms of research commissioning behaviour, and the wider implications of that (e.g. for university hiring).
- Questions as to how secure political support for this agenda will be over the longer term, including as the evidence base that recent reforms have sought to grow becomes more established and potentially more influential.

As a final comment, the review might also consider the potential for education researchers to do more to influence the quality of a broader public debate about education and education policy. This may even support policy impact, by influencing the wider 'discursive milieu' within which policy-makers operate. The role of researcher as 'public intellectual' is relatively underdeveloped in the UK, and particularly among education researchers these days, and it deserves to be given more attention. While we cannot assume that the general public is more receptive to research evidence that policy-makers or practitioners, this is a much richer and more potentially transformative idea than that encapsulated by instrumental notions of impact, and even some variants of currently fashionable rhetoric around 'public engagement'.

University of Bristol

Summary of main points

Please provide a brief summary (e.g. a list of bullet points), of not more than one side of A4, of the essential messages you are conveying in your response.

- We are committed to promoting the development of engaged, enthused, skilful, able and resourceful learners of English. We strive to do so by working with both beginning and experienced teachers and students in schools.

- Current priorities include responding to recent changes to ITE, the national curriculum for English (DfE, 2014) and the introduction of new GCSE and A level specifications.

- This response emphasises the symbiotic links between our joint roles as teacher educators, English teaching practitioners and researchers. As teacher educators we are located in universities yet work on a daily basis with schools and colleges. Our roles therefore involve teacher education, carrying out our own research (often involving active classroom teaching and English educational practice) and the testing and application of research findings.

- Collectively, we have published widely in the national and international field over the years in a variety of publications aimed variously at both new and experienced English practitioners and teachers, and academics/ fellow-researchers.

Questions for researchers

1. What broad area of educational research do you work in, and what is your role?
   The NATE ITE committee comprises course leaders of PGCE English programmes from around England (both Core and School Direct routes). As such, we research best practice in secondary English classrooms, with a view to:
   i) developing learners' knowledge, skills and competences in English, enthusing them with a love of learning in English and supporting them in becoming creative independent thinkers, and
   ii) training entrants to the profession to be innovative, enthusiastic and effective practitioners.

2. Describe the contribution your field has made to educational research, policy, teaching and learning, and society?
   The NATE ITE committee has been in existence for a very long time. Notable contributions made to educational research in the twenty-first century include: position papers on ITE; a TTRB-funded ITE website, produced jointly with the United Kingdom Literacy Association (UKLA); an annual ITE symposium for sharing English-specific research, now in its 11th year.

3. In the past 10 years, what would you judge as the most significant contributions your field has made?
   - **Publication of core texts for new teachers of English and established practitioners** (whole books and chapters), e.g. Fleming and Stevens (2010, 3rd ed; 2015 4th ed) English Teaching in the Secondary School: David Fulton; Brindley and Marshall (2015) Masterclass in English Education: Bloomsbury; Cliff Hodges (2016) Researching and teaching reading: Developing pedagogy through critical enquiry: Routledge; Boyd, Hymer and Lockney (2016) Learning Teaching: Becoming an Inspirational Teacher: Critical Publishing; Stevens and Lockney (2017, in press) Creative Spaces: students, places and identities in English and the arts: Routledge.

- **Publication of research-based, peer-reviewed articles about all aspects of English education for many key academic journals** e.g. English in Education (NATE); Literacy (UKLA); Changing English (edited by one of our NATE ITE committee members); English Teaching Practice and Critique. These articles also inform PGCE courses as readings for discussion and academic assignments, both of which fully integrate practice with theory.
- **Advancement of the National Writing Project** through establishing 'Teachers as Writers' groups
- **Publications commissioned by external agencies**, e.g. report for the British Educational Communications and Technology Agency (Becta) on best practice when using Information and Communications Technology (ICT) in the English classroom; contributions to/authoring of classroom resources for new and established practitioners e.g. BBC GCSE Bitesize; Poetry by Heart

4. What are the priorities in your field of educational research, and what is driving these?
English teaching today is informed by what has gone before. We see it as our responsibility to adopt a historical perspective on the subject of English teaching with a clear understanding of its trajectory over time (including the invaluable contribution made by key figures such as James Britton, Harold Rosen and Margaret Meek), as well as exploring the 'new'. The work of various NATE ITE committee members (e.g. via publications and talks/workshops at international conferences) also ensures that the teaching of English is seen in global, not merely local, sociocultural contexts.

   Current priorities include:
   - responding to significant changes in English education, including the introduction of new GCSE and A level specifications for first examination in 2017;
   - responding to the introduction of literacy 'resits' for those in Y7 who did not achieve sufficiently highly in KS2 tests (or any alternative assessment, in the wake of this week's announcement that the government no longer plans to introduce additional tests for year 7 pupils who did not achieve the expected standard);
   - working positively with a new national curriculum (DfE, 2014) that has excised all references to creative practice;
   - responding to new demands for knowledge of grammar / literacy;
   - responding to the pressures felt by school English departments through the introduction of Progress 8 and Attainment 8

   We are equally committed to responding to changes in ITE through the investigations of effective partnerships between HEIs, schools and training teachers in relation to English education.

5. What particular barriers and challenges do you face in undertaking educational research, and what changes might help overcome these? Please say whether these barriers and/or challenges apply to 'blue skies' or 'applied' research.
   We suggest that there is perhaps a lack of rigour applied to research findings of a number of popular/prominent writers on English education (typically through blogs) which results in some of their ideas or suggestions often being given undue weight; this can then distort the findings of more robust research carried out by academic researchers. A current example is the popular suggestion that group work is not effective in the classroom as suggested by writers such as Peal, R (2014) Progressively Worse: the Burden of Bad Ideas in British Schools: Civitas[98], despite a wealth of evidence that indicates that well-planned and well-managed group work is highly effective, as in Littleton and Mercer (2013) Interthinking - Putting Talk to Work: Routledge.

[98] e.g. see also Didau: http://www.learningspy.co.uk/featured/group-work-big-deal/

Another challenge is the perception that small-scale, qualitative research is of less value than large-scale quantitative research, a view reinforced by recent calls by high-profile commentators such as Ben Goldacre for more randomised control trials (RCTs), despite their professed limitations by English specialists such as Jones, S., Myhill, D., Watson, A., & Lines, H. (2013) Playful explicitness with grammar: A pedagogy for writing; Literacy, 47 (2), 103-111. However, small-scale qualitative research can have a powerful impact on teachers' pedagogy, not least when accumulated in publications such as Yandell, J. (2014) The social construction of meaning. Reading literature in urban English classrooms; London: Routledge.

6. What opportunities (including opportunities for dissemination) exist to deepen the contribution that your research field makes to policy, teaching and learning, and society?
   The greatest contribution that our research field makes to policy, teaching and learning, and society is the fundamental way in which it informs initial teacher education and the continuing professional development of teachers e.g. through studying for higher degrees. In particular, the small-scale qualitative research which is the bedrock of our own work as teacher educators is almost always replicable in other contexts. Trainee teachers and practitioners engaged in studying for their PGCE qualifications as well as higher degrees in education are almost always required to undertake their own research as an integral part of their learning. They therefore not only learn from the contributions we variously make, but - crucially - make their own contributions to the field as well, for example in articles published by students in Changing English or English in Education; in the Journal of Teacher Training Educational Research (JoTTER).

7. How do you disseminate your research?
   We publish in reputable national and international journals, including English in Education, Changing English (etc.) as well as disseminating our work to classroom teachers through NATE's Classroom magazine. We present papers and give keynotes at national and international conferences, including the International Federation for the Teaching of English (IFTE). For the past 11 years we have run an annual ITE research symposium in London in which delegates present and exchange research undertaken specifically in ITE English. Our work is also shared with our own trainee teachers, and the university and school-based colleagues with whom we work.

8. Are there demonstrations of effective links between educational researchers, policy-makers and practitioners in this country, or internationally, that the Working Group should be aware of?
   Yes. Many ITE English lecturers working in universities are educational researchers working on cutting-edge research in the field of English teaching whilst also being practising teacher educators working in partnership with school colleagues e.g. subject mentors. ITE English is therefore an exceptionally powerful space in which research and practice co-operate. There is considerable potential, therefore, for this work to inform policy, though in recent years our insights have been largely ignored (e.g. in recent years successive secretaries of state for education have chosen to downplay the potential of HEI-school partnerships for ITE).

   [NB with regard to "Questions for teachers, school and college leaders and teacher trainers" below: university lecturers working on ITE courses such as the PGCE, are **BOTH** researchers **AND** teacher educators, theorists **AND** practitioners, not one or the other.]

Questions for teachers, school and college leaders, and teacher trainers

1. How are you involved with teaching in schools and colleges?
   On both Core and School Direct PGCE routes, trainees are members of a school and university community. As course leaders, we work closely with the trainees, their mentors and their departments whilst they are in school. School-based colleagues come to our universities to work with the trainees in workshops and seminars. School-based colleagues are invited regularly to our universities to participate in CPD opportunities. Many university educators undertake research in classrooms, often in partnership with established teachers and trainee teachers.

2. Have you been involved in academic educational research?
   See Questions for Researchers above

3. How have educational research findings informed your work, and how has your usage of educational research findings changed over the past 10 years?
   See Questions for Researchers above

Questions for subject associations

1. How do educational research findings inform your work?
   The work of the NATE ITE committee is very important to the work of the subject association itself (and has been for many years. It informs NATE's thinking and practice via academic and practitioner publications, workshops and keynote talks at conferences, annual symposia, involvement in local branch work (e.g. the thriving London Association for the Teaching of English which is also co-ordinated by one of our NATE ITE committee members). Thus there is an integral connection between our work as a committee and the work of the Association centrally.

2. How easy do you find it to identify, access and make use of educational research, and what are your main sources of educational research findings?
   See Questions for Researchers above

3. What would be your priorities for educational research, and why?
   We see it as vital to 1) ensure the reliability and validity of research findings; 2) value small scale study; 3) further develop partnerships between schools and HEIs, ensuring dialogue between school-based practitioners and university-based educators

4. Are there demonstrations of effective links between practitioners, policy-makers and researchers in this country, or internationally, that the Working Group should be aware of?
   See Questions for Researchers above, which cite books and articles that emphasise the links already made between practitioners and researchers

Wellcome Trust

Summary of main points

- Wellcome funds education research through response-mode competitive grant funding, direct commissioning and a small amount of in-house research.

- We increasingly involve end-users in our research, including science teachers, school leaders and policymakers. Much of our work is collaborative, and we often partner with external organisations with aligned interests.

- The education research community should engage in a wide discussion about the cost, benefit and appropriateness of different methodological approaches, including the consideration of the role of evaluation and action research

Introduction

1. Wellcome exists to improve health for everyone by helping great ideas to thrive. Over the next five years, we plan to invest up to £5 billion on research to improve health. We also have a long standing commitment to making inspirational, high-quality science education available to all young people. Supporting teachers and creating a robust evidence base is at the heart of our education work.

What Wellcome funds

2. We fund education research through response-mode competitive grant funding, direct commissioning of research activity and a small amount of in-house research. Over the years, we have increasingly involved end-users – such as science teachers, school leaders or policymakers - in our research. Moving forward, we are committed to doing so as much and as early as possible in the process. We also make research data and findings as freely available and as accessible as possible.

3. The two largest commitments we have made to education research are £3 million for the Education and Neuroscience Initiative and £3.7 million for Science Learning+ (more details on both below). In 2016, Wellcome also made improving science education across the UK an organisational priority over the next five years, including growing the education research base.

4. We welcome the opportunity to contribute to this call - we share the belief that high quality research has the potential to transform education in the UK and beyond. We have enjoyed fruitful collaborations with the Royal Society on a number of projects and believe this could form a solid foundation for further work together.

Our priorities for education

5. **Informal science learning**. We wish to understand the impact of informal science learning experiences, build research capacity and bring the research and practice communities closer together. Our main effort is Science Learning+, a £9 million collaboration between Wellcome, the National Science Foundation and the Economic and Social Research Council.

6. **Education and neuroscience**. We aim to build the evidence base around the impacts of educational interventions informed by neuroscience and help teachers to better connect with this body of knowledge and influence its growth. This work includes the Education and Neuroscience Initiative: a £6 million collaboration with the Education Endowment Foundation (EEF), which is currently funding six research projects to improve our understanding of how neuroscience might benefit classroom practice.

7. **Enhancing and assessing practical skills**. We are interested in better understanding the impact of rich practical science experiences, especially extended project work, on students (as well as others involved, such as teachers or researchers). We are also collaborating with the Gatsby Charitable Foundation and the Nuffield Foundation on a programme of work supporting practical science in schools and colleges. Part of this will involve gathering evidence on the quantity and quality of practical science, as well as investigating the impact that GCSE and A level qualification reform is having on practical work. We also plan to fund research into better methodologies for the assessment of practical science.

8. **Monitoring Science in Schools**
    a. **Science Education Tracker**. Gaining a clear understanding of young people's attitudes towards and experiences of science education is critical to our work. In partnership with the Department for Business, Energy and Industrial Strategy, the Department for Education and the Royal Society, we commissioned a large-scale, representative survey of more than 4,000 14- to 18-year-olds to provide credible baselines and insights that inform policy and practice. We plan to publish in January 2017 and to repeat the survey in 2019.

    b. **Primary Science Evaluation**. We will be launching a major campaign to improve primary science in January 2017. As part of this work, we will be carefully monitoring science in primary schools over the course of the next four years. This monitoring is intended to help us understand what is happening in schools, and should be relevant to other stakeholders.

9. **Other research interests.** We have a number of other research interests, such as:
    a. how to increase student numbers in particular areas of shortage (e.g., bioinformatics)
    b. how to change our language and approach to informal learning experiences so that they resonate more effectively with young people from disadvantaged backgrounds
    c. whether participation in continuing professional development impacts upon teacher retention.

10. The priorities above will guide our work over the next five years. However, we recognise that the education field can undergo rapid and radical change and our research priorities may be influenced by external policy developments. This may include new Government policy, newly published research, ideas generated in partnership with other stakeholders or funders, and how we are progressing towards our goals. Likewise, Wellcome continues to explore new strands of work, some of which may influence our education research priorities.

11. To what extent do you, or would you, collaborate with other funders who have similar missions?
    As indicated above, almost all of our work is in collaboration with others. These collaborations involve a wide range of partners, take many forms and occur for different reasons. The collaborations tend to be thematically based, exploiting aligned interests and so, by necessity, they build on a base of information sharing and effective communication.

12. Sometimes partners have aligned objectives and are pooling funds and expertise for greater impact. In other cases, we may have distinct but overlapping aims or different areas of expertise which enable work to be achieved much more effectively in partnership. In some cases, there is collaboration on a single piece of work (e.g., the Science Education Tracker) and in others, a coalition has formed in an area of interest, with different partners progressing different complementary elements (e.g., the practical science collaboration with Nuffield and Gatsby).

Challenges and opportunities in educational research

Engagement between researchers and schools

13. Many funders, including ourselves, are fostering a culture of engagement between researchers and schools. In addition, there is a groundswell of interest from educators themselves in becoming more engaged in research, as characterised by the ResearchEd movement. However, it can still be challenging to truly engage schools and educators from the inception of research, rather than simply recruiting them to participate in trials or to translate research findings. Funders may need to provide time, mechanisms and funding to allow for the co-creation of research proposals.

14. Over 7,500 schools are involved in research funded by the EEF alone, helping to grow their understanding of the research process and the use of evidence.[99] It will be important to avoid trial fatigue if the current level of activity is to continue or grow. Encouraging schools to shape research projects may help sustain their engagement as well as improving the relevance and translation of findings.

Research methodologies and skills

15. There has been a new emphasis in recent years on rigorous, large scale research, not least through the emphasis on randomised control trials (RCT), by the EEF. This has undoubtedly increased the number of researchers with relevant expertise. However, we should not under-estimate the value of other approaches, including the significant amount of small-scale action research being conducted by teachers in classrooms. Mechanisms for how this can be bolstered by the research community and shared more widely should be investigated.[100]

16. Evaluation is an essential element of education research. Our Informal Learning review (2012) discussed the dichotomy between research literature typically published in journals, and grey literature – evaluations of specific schemes typically published on websites. The latter can be useful in understanding implementation issues and driving innovation and can be the only realistic option for small scale projects. In our work, we strive to connect researchers and practitioners better, including sharing evaluations more widely (they are often treated more as an accountability measure).

17. We believe that it would be beneficial for the education research community to engage in a wide discussion about the cost, benefit and appropriateness of different methodological approaches in different contexts, including how to approach research questions for which a standard RCT methodology is not appropriate.

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[99] Education Endowment Foundation, *Five schools win £1m funding to support 1,000 schools in the next year* (EEF, London, 2016), https://educationendowmentfoundation.org.uk/news/five-schools-win-1m-funding-to-support-1000-school-in-the-next-year/)

[100] Education Development Trust, *Evidence that counts: 12 teacher-led randomised controlled trials and other styles of experimental research* (EDT, Reading, 2016, available at https://www.educationdevelopmenttrust.com/~/media/EDT/Reports/Research/2015/r-_EvidenceThatCounts_V2.pdf)

Timescale for evidence gathering

Good, robust research evidence takes time to measure and collect. The time lag between formulation of the research question, data collection, validation, review and publication of the evidence can be several years. Yet the timescale for policy change is often shorter than this. We need to develop better mechanisms for identifying and performing research in a timeframe that enables it to more effectively benefit policy making.

Department for Education research funding

1. The Department for Education (DfE) should have sufficient budget to conduct research and robust evaluations to inform its policy development, implementation and monitoring. However, the department's net expenditure on R&D fell by 64% between 2007-08 and 2013-14 (from £39 million to £14 million).[101]

2. Arguably DfE's investment in the EEF endowment of £125 million, to be spent over 15 years, partially offsets this decline in publicly funded research. However, EEF funding is focused on a particular set of priorities quite different from wider departmental research needs. In 2014, we participated in a discussion with DfE about their series of research priority and question papers, of much wider scope than work of the EEF. It seemed that one of the purposes of publishing these papers was to encourage other researchers and funders to generate the research. It would be interesting to explore the extent to which these priorities have been addressed and by which organisations.[102]

Research across the UK

3. Many funders of education research do not cover the whole of the UK but focus on England. Much of Wellcome's education research funding, such as Science Learning+ and Education Neuroscience, is available to recipients across the UK. However, we have found that research on the experience and delivery of education across the country is challenging. Each nation's education system is distinct, arguably increasingly so, and so generalising responses is often inappropriate. In addition, because the devolved nations have relatively small populations, achieving a large enough sample to be representative can be difficult.

4. To elaborate, in 2015, we commissioned Ipsos MORI to conduct scoping research[103] for us on the best methodology to identify and reach a representative sample of young people across the UK for the Science Education Tracker. The differences in the availability of databases containing the relevant details of young people across the UK made us concerned that we would not be able to reach comparable samples. Combined with the need to oversample in the devolved nations, and uncertainty about response rate, we decided to limit the survey to England, at least in the first instance.

Interdisciplinary and collaborative research

5. Educational researchers should not work in isolation. Our two large education funding areas both involve interdisciplinary and collaborative research – which bring new opportunities but also challenges. We have learnt the importance of building in time to foster genuine and productive collaborations between people working in different fields, and find ways for them to meet – physically or virtually. Seed funding can also be helpful.

[101] House of Commons Library, Spending on Research and Development in the UK (21 July 2015, http://researchbriefings.parliament.uk/ResearchBriefing/Summary/SN04223); BIS, *SET Statistics* (2013, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/246231/13-499-set-statistics-2013A.pdf)
[102] Papers published included the following policy areas: Teachers and Teaching and Early education and childcare Assessment, curriculum and qualifications - https://www.gov.uk/government/news/setting-research-priorities-in-education-and-childrens-services
[103] This will be published towards the end of 2016

6. For instance, educational neuroscience (also 'Neuroeducation' and 'Mind, Brain and Education') is a growing interdisciplinary research field bringing together neuroscience, psychology and education, to better understand the learning process and inform classroom practice. There are a growing number of Masters programmes offered in educational neuroscience and a number of new dedicated journals and conferences.[104] Wellcome is also trying to foster relationships and collaborations across these communities. In 2015, we ran an online event which allowed teachers to have discussions about learning and the brain with neuroscientists and psychologists. It was visited by 7,000 users over six weeks and our evaluation showed that it gave teachers a clearer insight about what the research could and could not tell them. Researchers benefitted by gaining exposure to the types of questions teachers wanted answers to.

Examples of effective links between researchers, policy-makers and practitioners

1. The Targeted Initiative on Science and Mathematics Education (TISME) provides an interesting example of a number of research projects funded by the Economic and Social Research Council. These were brought together with support from the Gatsby Charitable Foundation, the Institute of Physics and the Association for Science Education to reflect upon their collective findings and relevance to policy and practice.

2. Although we are not aware of whether the impact of this approach has been formally evaluated, it seems that these projects have had a high level of visibility and influence on the thinking of policy makers and practitioners. We have tried to take a similar programmatic approach to Science Learning+ and the Education Neuroscience Initiative from their outset, providing wider networking opportunities, sharing information about the projects as they are progressing, and considering how to build impacts as research comes to fruition.

Ensuring impact of educational research

3. Wellcome is a signatory to the Concordat on Open Research Data,[7] which ensures that research data gathered and generated by members of the UK research community is made openly available wherever possible. We publish educational research that we have directly commissioned on our website and appropriate supporting data on the UK Data Service. Research we fund through grants tends to be published in journals and we strive to make these publications open access. We also encourage more readable summaries of complex research, so it is accessible by the widest possible audience (e.g., infographics[8] based on the findings from our Wellcome Trust Monitor survey), and promote them through a wide range of channels.

4. A key mechanism for ensuring the impact of educational research is to involve teachers and schools from the planning stage of a project. This means that the research can be shaped to uncover insights that are relevant and applicable in the classroom. It helps generate buy-in from teachers and fosters a genuine collaborative partnership.

[104] E.g. the International Mind, Brain and Education Society, www.imbes.org

WISERD

Summary of main points

The Wales Institute of Social and Economic Research, Data & Methods (WISERD) is a collaboration between the Universities of Aberystwyth, Bangor, Cardiff, South Wales and Swansea which undertakes a significant amount of educational research.

Although it undertakes research on a wide range of educationally-relevant topics, its research largely falls in the following three substantive areas:

- The relationship between poverty, inequalities and wider educational opportunities
- Education and economic development
- The impact of policy

WISERD also specialises in the following methodological approaches:

- Longitudinal research
- The use of administrative data
- Comparative analysis

We believe that these methods, combined with interdisciplinary lenses, are important for the future of educational research. These approaches illuminate the complex relationships between social context and educational progress over time and enable those working in the field to draw on the resources and expertise of the best social science. The UK cohort studies are among the best in the world and the opportunities they provide for educational research have not been exploited as much as they could be. One factor in this is the continued lack of capacity in quantitative skills among educational researchers.

The Working Group should be aware of WISERD Education – which is a capacity-building venture that has been funded by HEFCW and is now receiving investment from Cardiff University.

WISERD Education has two features that make it unique:

- It draws expertise from centres of excellence across Wales (even if not in the area of education) in order to build capacity in educational research, an area where there has been a decline in capacity in recent years.

- It has established the WMCS (WISERD Education Multi-Cohort Study) which collects longitudinal data from children and young people across Wales in order to provide a vast data resource that is available for all researchers who would like to explore it for their own research.

Four years in, we are now evaluating the success of WISERD Education. Our assessment is that while we have made progress, this has often been slow and uneven. Our experience highlights the very challenges of building capacity in educational research in a context where there is a low base of expertise and staff are struggling with the competing demands of initial teacher education in particular.

Questions for researchers

1. What broad area of educational research do you work in, and what is your role?

The Wales Institute of Social and Economic Research, Data & Methods (WISERD) is a collaboration between the Universities of Aberystwyth, Bangor, Cardiff, South Wales and Swansea. The principal

aims of WISERD include developing the quality and quantity of basic social science research in Wales, and strengthening the impact of social science research on the development of policy in the public, private and third sectors through a focus on knowledge exchange and engagement. As education is an area of policy which is devolved to the Welsh Government, a significant part of WISERD's research activity addresses educational issues.

Within the broad area of educational research, we undertake interdisciplinary research which mainly draws on the following methodological approaches:

- Longitudinal research
  We undertake extensive analysis of educationally-relevant longitudinal data from a range of cohort studies (e.g. NCDS, BCS, MCS) and panel surveys (e.g. BHPS, European Social Survey). WISERD also runs the WMCS (WISERD Education Multi-Cohort Study) which follows the careers of 1200 children and young people in Wales.

- Use of administrative data
  WISERD is a key partner in the Administrative Data Research Centre (ADRC) Wales, which is part of the Administrative Data Research Network and which seeks to enhance the analytical opportunities of administrative datasets. For example, the ESRC/HEFCW-funded project 'Impact and Effectiveness of Widening Access to HE in Wales' linked data from the National Pupil Data Base (NPD) for Wales; the Lifelong Learning Wales Record (LLWR); and the Higher Education Statistics Agency (HESA).

- Comparative analysis
  WISERD undertakes 'home international' (and wider international) comparative analyses in order to explore the linkages between policy context and social and educational outcomes. An example of this is the ESRC-funded project 'Growing up in 21st Century Britain' which used MCS data to explore national variations across the UK to examine the differential effects of policy and context on young children's wellbeing and attainment.

In terms of substantive issues, WISERD largely undertakes educational research in the following areas:

- The relationship between poverty, inequalities and wider educational opportunities
- Education and economic development
- The impact of policy

All of these issues are also currently being investigated through the ESRC WISERD/Civil Society programme of research which is exploring education's relationship with and contribution to civil society.

2. Describe the contribution your field has made to educational research, policy, teaching and learning, and society?

Each of the disciplines represented within WISERD makes a contribution to educational research. However, we think that it is the interdisciplinary of WISERD that makes the most distinctive contribution as it reveals the complex interactions between families, individuals, institutions, communities and government.

For example, we have recently used GIS analysis to show the uneven distribution of and access to child-care provision across Wales. We have undertaken economic analysis of the introduction of child-centred education through the Foundation Phase and explored the complex Interplay of social and geographical factors in shaping access to higher education.

3. In the past 10 years, what would you judge as the most significant contributions your field has made?
   As indicated by our areas of methodological expertise, we think the most significant contributions include:
   - The growth of longitudinal analysis
   - The increasing availability and accessibility of administrative data
   - The development of comparative analysis (both home international and wider international)

   We recognise that these are not widespread developments in educational research, but we do regard these as the most important – both for blue skies and for applied policy research in education, and this is reflected in the priorities of WISERD's research programme.

   These contributions are significant because they broaden the scope of educational research beyond the conventional concerns with teachers and pedagogies. We also think that the use of longitudinal data (and particularly the world-leading cohort studies) provides an opportunity for educational research in the UK to contribute to the wider development of social sciences more generally – and internationally.

4. What are the priorities in your field of educational research, and what is driving these?
   There are enduring priorities around the relationship between socio-economic inequalities and educational attainment and opportunities – driven by the relative inability of a range of successive interventions to make a significant difference.

   An emerging priority must be the need to develop a more sophisticated understanding of the strengths and weaknesses of using performance data. While education researchers have been successful in revealing the problems of comparing individual and institutional attainment data (e.g. through 'value-added' measures etc.), there is a need to bring similar scrutiny to regional and national level comparisons. In addition, we need to move from the current concentration on simple attainment 'outputs' to a more complex understanding of broader outcomes. It is important that policy-makers understand the wider benefits of education.

   Of course, the research-policy-practice relationship has been an enduring issue for education, but the rise of the 'what works' agenda makes this a priority. It is imperative that policy-makers acknowledge the complexity of educational systems. In arguing for more complex understandings, we are not seeking to denigrate any particular research approach, but to argue that researchers and policy-makers need to be clear about the limits of the different kinds of 'evidence' they are using.

5. What particular barriers and challenges do you face in undertaking educational research, and what changes might help overcome these? Please say whether these barriers and/or challenges apply to 'blue skies' or 'applied' research.

   Funding
   Funding continues to be a challenge as a result of a number of issues. Firstly, the uncertainty of the future of European research-funding is particularly damaging. There are also issues with RCUK funding as the 'success rates' continue to fall in line with the relative decrease in the amount of funding available.

   Research capacity
   Although there are increasing numbers of doctoral students, there still seems to be a shortage in the supply of post-doctoral researchers with adequate quantitative research skills. There is also

a shortage of social science researchers with Welsh language skills which creates particular difficulties for educational research given the high proportion of Welsh medium schools we work with.

Applied research
While WISERD enjoys good relationships with policy-makers in Wales, we nevertheless find it difficult to respond to government and local authority research tenders because of the short timescales and turn-around times.

Being a small country
Although this is difficult to quantify, colleagues in WISERD report that there is a perception that research on education in Wales is of interest only for those of us in Wales – and somehow of less significance for the field of education as a whole than research on England.

6. What opportunities (including opportunities for dissemination) exist to deepen the contribution that your research field makes to policy, teaching and learning, and society?
We are relatively fortunate in Wales in that there are a number of organisations designed to foster closer relationships between researchers and policy-makers and practitioners. In addition to WISERD itself, we have the Public Policy Institute for Wales (PPiW), and the NESTA-supported Y-Lab. Even so, the impact of our research on policy tends to be limited. For example, while the WISERD report on widening access to higher education was publicly praised, its findings have yet to have any significant impact on policy or practice.

   Increasing the impact of research is a two-way process and it is important that those involved with the process of policy formulation also play their part in the making sure research is used to good effect.

7. How do you disseminate your research?
We have a range of dissemination activities – each one appropriately targeted to different audiences. These range from conventional academic outputs and events to those aimed at a wide range of non-academic stakeholders and publics. We make increasing use of new technologies and social media, e.g. 'blogging' and Twitter. A key element in our success here is the funding for professional services posts whose remit is to make this happen.

8. Are there demonstrations of effective links between educational researchers, policy-makers and practitioners in this country, or internationally, that the Working Group should be aware of?
The Working Group should be aware of WISERD Education – which is a capacity-building venture that has been funded by HEFCW and is now receiving investment from Cardiff University.

   WISERD Education has two features that make it unique. Firstly, and like WISERD more generally, it is designed to foster links across Welsh universities in order to build capacity. It draws expertise from centres of excellence (even if not in the area of education) in order to build capacity in education research, area where there has been a decline in capacity in research years.

   Secondly, WISERD Education has sought to increase the relevance and rigour of educational research in Wales through establishing the WMCS (WISERD Education Multi-Cohort Study) which collects longitudinal data from children and young people across Wales in order to provide a vast data resource that is available for all researchers who would like to explore it for their own research.

Four years in, we are now evaluating the success of WISERD Education. Our assessment is that while we have made progress, this has often been slow and uneven. Our experience highlights the very real challenges of building capacity in educational research in a context where there is a low base of expertise and staff are struggling with the competing demands of initial teacher education in particular.