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Authors: Sarah Younie, Richard Procter, Jonnie Noakes, Geraldine Davis, Jon Audain

Title: Developing Evidence-informed practice: engaging teachers with research

> *The teacher is at the epicentre of the learning process; and learning therefore depends first and foremost on the quality of the teacher. (UNESCO, 2007, p.15)*

Abstract

The field of education is awash with research. What is important for teachers however is accessing the right research, in the right way, at the right time. This paper presents an innovative way forward for teachers who want to develop evidence-informed practice and for those who want to be engage further with research.

We start with explaining the concept of translational research, which is a systematic approach to the practical application of research knowledge. We have followed this approach in the development of the MESHGuides project, which provides research summaries for teachers. The research evidence is presented in a visual format so that it is accessible and can inform teachers professional judgements and practices. This approach is informed by initiatives adopted in the field of medicine.

Furthermore, we are developing the MESHConnect initiative that aims to create and engage communities of teachers both in and with research. This initiative aims to develop teachers by engaging them in the broader community of researchers in education, so that they are able to develop a critical perspective on research to inform their own professional practices.

KeyWords

Evidence informed practice, translational research, research summaries, teacher development

Introduction

This article reports on an innovative online Continuing Professional Development (CPD) resource which gives teachers access to up-to-date research summaries. These summaries are written, peer reviewed and quality assured by teachers and researchers working in collaboration to develop an evidence-base for the profession which is easily accessible and digestible.

The Problem

This paper will address why teachers need to easily access research in order to enhance their professional practice. We start by asking: why aren't policy and practice in the education profession underpinned by an agreed body of research-based evidence? The answer is probably that teaching and learning are among the most complex of all human activities

(Edwards, 2011, p.135), and not that there is a lack of original, rigorous and significant research work across the discipline of education. Questions arise about how teachers should respond to the issue of implementing evidence in their practice.

In the UK, building and making accessible a reliable database of evidence-based research has strengthened policy and practice in the medical and health professions through such collaborations as the Map of Medical Health guides[1] and the National Institute for Health and Clinical Excellence (NICE)[2]. Improving education systems in a similar way though has proved to be an elusive goal, both in the UK and across other countries. In its 2009 report, the OECD (Organisation for Economic Cooperation and Development) calls for the creation of knowledge-rich, evidence-based systems to empower educational leaders and teachers with the knowledge needed to transform models of schooling (OECD, 2009).

The education sector has within it the knowledge needed to improve the education of all pupils, but this knowledge is held in isolated pockets and is not yet accessible to all teachers in developing or developed countries. Connection, co-ordination and curation by a national body are needed, coupled with networking of knowledge holders, teachers, researchers, educators and funders to share and build knowledge for the profession.

The goal therefore is to share research knowledge that informs professional practice. This provides a robust knowledge management approach to the field of education. The use of knowledge management principles is well known in other sectors (Tiwana, 2000; Davenport and Prusak, 2000), public and private, and now needs to be robustly developed in the education sector. The OECD has previously highlighted that knowledge management is seriously under-developed in the field of education (OECD, 2000; 2004; 2007; 2009).

Developing translational research in education

Translational research can be described as a systematic approach to turn research knowledge into practical applications (Wethington and Dunifon, 2012). However, to date, such research has most widely been associated with the field of science and has yet to be made a reality in education. An example of this approach can be seen in the Map of Medicine: http://healthguides.mapofmedicine.com/choices/map/index.html .

To date, the concept of translational research has not become well established in the education sector. Translational research provides a bridge between researchers and practitioners. To this end, a new kind of publishing has been developed in the form of knowledge maps (called MESHGuides) which translate the findings of educational research into practical outcomes. MESH stands for Mapping Educational Specialist knowHow; examples can be seen at www. MESHGuides.org. New software is being developed similar to the successful Map of Medicine Healthguides created by health professionals to train new doctors.

[1] http://mapofmedicine.com

[2] http://pathways.nice.org.uk

The goal therefore is to develop new ways of working, now made possible by digital technologies, which can address long standing improvement challenges faced by education sectors in all countries (OECD, 2009; OECD, 2010; Barber and Mourshed, 2007). One solution is an initiative involving educators worldwide in building a quality assured wikipedia of professional knowledge for teaching. To this end, we have developed a translational research project, called MESHGuides that are quality assured and tested with teachers, which provide advice linked to research and evidence. MESHGuides use low-cost digital technologies and an innovative knowledge mapping approach to provide personalised, research-based advice and 'just in time' learning which is accessible across a range of devices to support teachers in extending and deepening their professional knowledge. MESHGuides contribute to addressing the issue that no country can afford the costs of providing CPD (continuing professional development) out of school for teachers (UNESCO, 2007; Hudson 2016). This challenge of continually updating teachers is one which has not yet been resolved. MESH is a research project applying knowledge management principles which are well known in other sectors, public and private, to the education sector (Leask and Younie, 2013). It is an initiative involving educators worldwide in building quality assured research summaries for professional practice.

With respect to education, it is a challenge for busy teacher-practitioners to keep up-to-date with the latest research on effective learning and teaching. The first challeneg is accessing the evidence base, which is locked away behind 'pay walls' of academic journals and is disparately spread across hundreds of different research journals. Second, traditional models of CPD as a way of updating teacher's knowledge are very costly when they require teachers to be away from the classroom (UNESCO, 2007; Bubb and Early, 2006). By providing teachers with access to educational research summaries through MESHGuides, free at the point of access, the gap between research and practice can be bridged, which links researchers and teachers in a dynamic relationship between evidence and practice. To this end, MESH forms a knowledge mobilisation strategy (Jones et al., 2015) that translates research into classroom practice for teachers.

MESHGuides are a form of online publishing for teachers' CPD, which is being developed by educators worldwide. The approach can be likened to a quality assured Wikipedia of professional knowledge for teaching. MESHGuides are online graphical flowcharts or pathways that map complex research, to make it accessible to practitioners. They are written by academic experts and are subject to the same rigours of quality assurance as the production of journal articles. Upon submission, each MESHGuide is subject to blind peer review. There is a panel of reviewers for each curriculum subject which consists of other academics and also teachers who provide valuable practitioner experience. MESHGuides are only published online once the reviewers and the editorial panel for that curriculum subject are satisfied with the quality of the research that is being presented in that guide.

Creating a self-improving system: an education solution

The *Education Futures Collaboration* (EFC) charity provides governance for the MESH knowledge mobilisation initiative. The MESH project has developed an innovative and accessible database of research-based evidence to inform educational policy and practice and provide a collaborative tool-kit to engage teachers and researchers in on-going knowledge development for the profession. MESH as an international knowledge mobilisation strategy

(Levin, 2013) uses online technologies to support teachers building evidence-informed practice. Through the creation of online research summaries (MESHGuides) teachers and researchers work collaboratively to map the evidence for specific subjects and topics. MESHGuides aim to provide evidence-based advice, which can be quickly accessed by internet-enabled mobile devices.

The rationale for the development of this initiative is founded on the fact that for teachers, research knowledge and the management of that research knowledge within the education sector are lacking systemic organisation (OECD 2009, Leask and Younie 2013). Published educational research in academic journals is rarely focused on the knowledge teachers need to know to improve educational outcomes for their pupils. We seek to change this so practice can be firmly based on research evidence, providing teachers with a solid underpinning to their work.

MESH aims to harness the expertise of educators worldwide through the power of online communication and collaboration to connect excellence in teaching and learning and evidence-based practice across time and place. This is achieved through the MESHGuides providing research summaries and MESHConnect providing a dynamic network of teachers and researchers.

So, in addition to the online guides, MESH is also establishing a teacher-researcher network. Using the power of professional e-networking to connect like-minded people, MESH provides tailored internet-based workspaces to enable the creation of collaborative and innovative solutions for the improvement of educational provision. Networking educators is proposed as critical to improving the quality of teaching. This is where the MESHConnect concept is being developed - providing a clear purpose for networking i.e. producing dialogue and feedback on the research summaries, which add to a public evidence base for practice.

MESH is a collaboration that seeks to unite those who work day-to-day in the classroom with the academic and research-based community. The theory and practice sit side by side and therefore all members of the education community can become involved at different levels**.** In this next section we consider how different groups of professionals may use and interact with the MESH initiative. Of course, how different professional groups use MESHGuides and MESHConnect depends on the responsibilities of that group, and the challenges that they face in their day-to-day work. Equally the extent of their professional knowledge and the training they have received will have an influence on their needs**.**

How different audiences can interact with MESH, from trainee teachers to senior leaders

Student teachers and Newly Qualified Teachers may wish to read the guides through from beginning to end as they start to build their professional knowledge, and then come back to particular guides to extend their specialist knowledge. For example, student teachers will be marking pupils' work and every teacher is a teacher of English. As a start, teachers may wish to look at how to address errors in spelling via the MESHGuide on spelling and specifically the section entitled the 'five most common errors in spelling'. This could be shared with

pupils and use the professional language to describe patterns of errors e.g. ‘transposition’ and ‘omission’.

Class teachers may just wish to read the Guides that are relevant to them to keep up to date, or to adapt the advice to specific classroom practice. Alternatively, teachers may wish to be actively engaged in research and to develop their own practice. Teachers may be part of a teacher-research network already, or studying for a Masters qualification, in which case the ‘areas for further research’ on existing MESHGuides would be of interest. Feedback from teachers’ findings would be very welcome: teachers are encouraged to feed into the existing knowledge base so it can be further developed. We suggest teachers browse the list of Guides and read the ones most relevant to them and their learners.

School leaders and professional development leaders may find it useful to take certain sections of guides to shape professional development sessions in school. For example, one headteacher said he intended to use the guidance on identification of ‘reluctant writers’ to prompt discussion and analysis in a staff session reviewing children’s progress. In particular, the head wanted to draw attention to the interventions that teachers could make in the classroom that research has found to be effective in supporting reluctant writers. Another found the English as an Additional Language (EAL) guide invaluable in helping staff to understand how to support EAL learners. The pedagogic interventions outlined in the guides to support teachers’ classroom practice are underpinned by research in the field, which has been published previously in academic journals and quality assured.

Policy makers may find that the guides provide summaries to a range of topics of interest. The guides provide a visual way to navigate around a complex topic, thus providing insights into how a topic can be approached.

Previous research about teachers’ perceptions of MESHGuides (Procter, 2014; Jones, Procter and Younie, 2015) has provided suggestions as to how practitioners could consider using the MESHGuides. In their research a range of practitioners including classroom teachers, heads of departments and headteachers from both primary and secondary settings were asked for their opinions of the MESHGuides approach in an online survey. Respondents stated they would use the guides to focus their practices and to back up their decisions related to their teaching practices. Equally, supporting teachers’ planning was seen to be important. Respondents were also interested in using guides collaboratively in peer INSET training, for use with student teachers and staff CPD to encourage teachers to understand what evidence can say about practice.

Although we have presented our research findings of how we think practitioners could engage with the MESHGuides, teachers are creative people and will use resources in innovative and creative ways. The following section proposes one way of engaging teachers with the guides so that these creative practices can be captured and shared for the benefit of the broader teacher community.

MESHConnect - connected learning: developing a teacher researcher network

MESHConnect operates like a professional social networking site that facilitates an online interactive space for collaboration between teachers and researchers. It supports partnerships, co-research and collaborative networking for innovative educators engaged in improving the quality of education. New community work spaces can be rapidly set up to respond to the needs of members, and membership is open to anyone interested in education.
The MESH strategy of participatory knowledge mobilization provides an online environment that brings together and supports a sustainable worldwide network of educators (teachers and researchers) who wish to collaborate in using evidence-based research to improve their professional practice. The online tools underpinning this have facilitated teachers and researchers connecting together for the production of MESHGuides. The challenge now is how to turn this into a sustainable ecosystem so that practitioners can add to the development of new knowledge, thereby truly embedding translational research in the field of education.

We argue that online publishing of research summaries and collaboration between researchers and teachers make knowledge management in education a real possibility. Imagine if teachers

* could easily contribute to and access research-based pedagogic knowledge and tools, including barriers to learning threshold and troublesome concepts; diagnosis and intervention strategies – in every concept and subject, for every type of learner across all key stages.
* could easily contribute to and access an evidence base for effective practice that is founded on cumulative research over years, providing a wider foundation for practice, rather than being small scale and rarely useful to teachers
* applied the full Stenhouse model for action research – scaling up case studies across different settings.

Could educators across schools, sectors, regions and countries work together to achieve this vision? Current approaches tend to be rather piecemeal: could we connect them up, creating an inclusive network of networks, providing and respecting a range of approaches, which contribute to the overall goal of improving the evidence base for practice?

MESHConnect is a grass-roots network of schools working with universities to create dynamic dialogue between teachers and researchers to develop, where appropriate, communities of practice that coalesce around particular issues, topics and/or curriculum areas. The aim is to collaborate to build the evidence base for practice, with feedback mechanisms for critiquing current research and updating existing knowledge with new research, in order to create a self-critical, self-improving system.

This initiative is timely: new technologies allow low-cost connectivity, knowledge sharing and bridging of the gap between researchers, pedagogic and subject content experts and teachers in their classrooms. To realize the opportunities available through these technologies requires collaboration and a technological infrastructure which allows a teacher, regardless of location or language, to find a professional network that is undertaking research e.g. in an area of interest to them. It is then possible to link pedagogic or subject specialist experts who

have deep experience and research in an area with teacher practitioners. Collective effort with each small group of experts sharing their knowledge for the benefit of all teachers and learners provides a self-sustaining network for ongoing improvement.

The MESHConnect network does not aim to compete with existing services to achieve this, but rather signpost to and help educators connect with existing practice and test new ways of working to achieve evidence-based practice and an ever-growing knowledge base for the profession.

Figure 1 sets out the vision for the developing relationship between theory and practice as a teacher moves from novice to experienced professional.

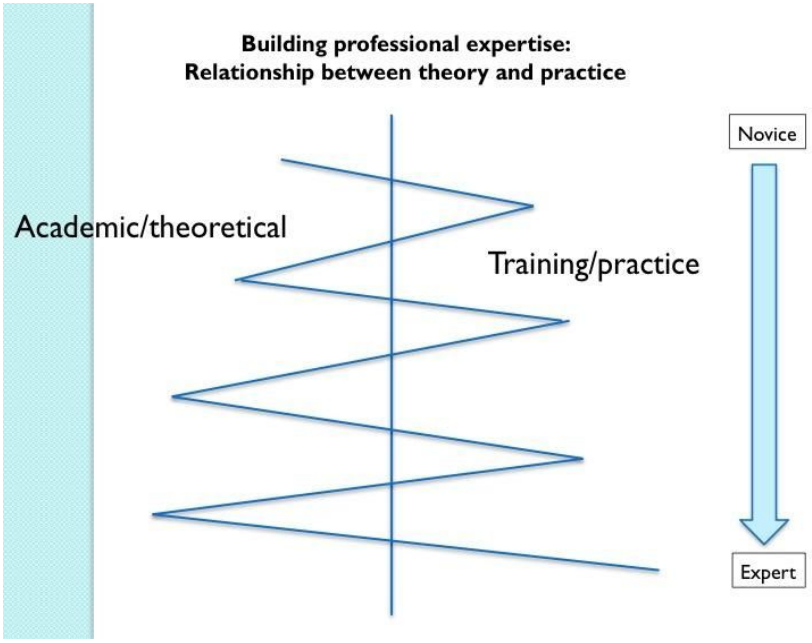

Figure 1: Professional expertise is a blend of research and practice

Collaboration between researchers sharing their knowledge and teachers applying and adapting that knowledge for their own practice, and feeding back their practical evidence, provides a self-sustaining network for ongoing improvement. See Figure 2.

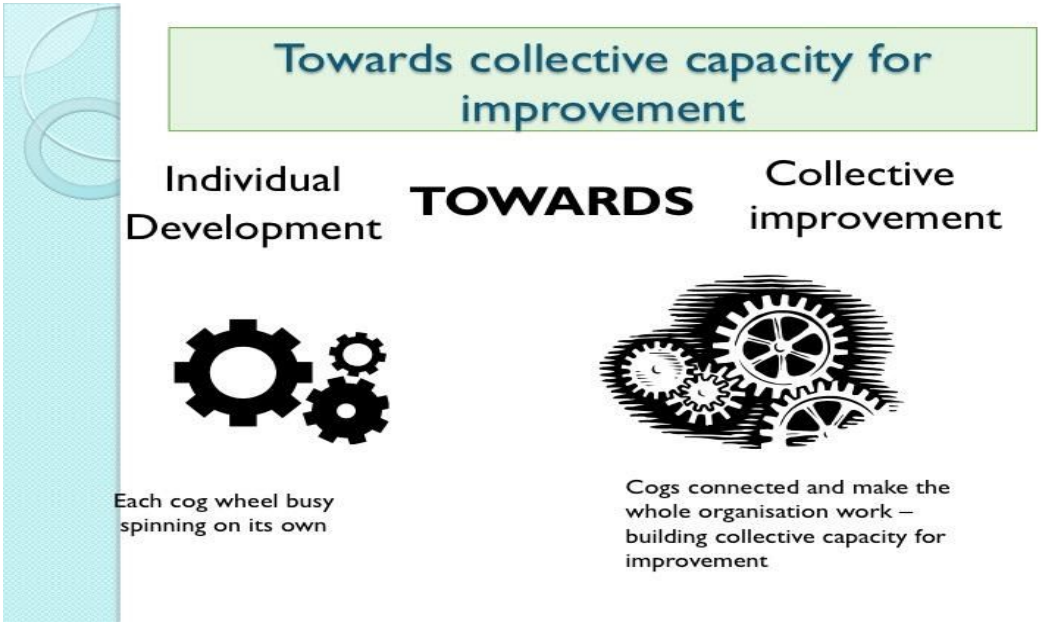

Figure 2: Collaboration provides an engine for sustainable ongoing improvement

MESHConnect has been designed to take advantage of the new opportunities to meet the needs of teachers and educators to develop, test and share evidence-based practice in education, further developing the profession's knowledge and understanding of what works. Recognising that knowledge is rarely static, MESHConnect supports the testing of evidence by teachers in their own settings and context and the sharing of that knowledge more widely. In doing so the network will

- build a growing body of evidence-based research in education, tested, owned and valued by the profession;
- empower teachers to be research-literate;
- provide evidence to dispel education myths (which are prevalent); and,
- support the increasing drive for school-to-school, educator-to-educator learning.

In essence, we propose MESHConnect has a role in

- connecting teachers, pupils and researchers - i.e. providing *professional* networking for knowledge sharing and mobilization, as well as scaling up promising small-scale research via online fora and associated digital tools;
- providing open access to research and development (R&D) tools, e.g. six-week intervention tools and training (see MESH toolkit examples);
- curating, synthesising and distributing research via the online guides (research summaries: MESHGuides – see prototypes)
- identifying gaps in research (see 'Areas for Further Research' in each MESHGuide prototype);
- arranging events (like TeachMeets) to bring together teachers and researchers in organised formal and informal meetings to share best practice, teaching innovations and personal experiences of teaching so that the knowledge base is updated regularly
- providing open publications; and,
- curating existing networks to facilitate knowledge sharing globally.

To maximize the opportunities for teachers and the associated outcomes for pupils in schools everywhere, MESH members are committed to working to ensure the resources and online communities are open to all teachers, regardless of location, and free at the point of access.

Alongside the MESHGuides website providing access to the research base for educators, the translational research initiative also utilises online collaboration to link teachers and researchers together via an online network that enables working groups to establish themselves and form a community of practice around particular subjects or topics. These communities of practice form around a research topic to collaborate and generate new research and interrogate prior research. Prior research in the form of a MESHGuide is a summary of previously published research that has been collated, synthesised and curated into a practical guide for teachers - that is, translated from theory to practice. However, this curation of knowledge is not static but dynamic, in that it is open to interrogation from teachers who, in collaboration with researchers, will continue to develop the knowledge as new data is collected which will either add to the strength of previous research findings or challenge them. Knowledge is contestable and always developing, and teachers and researchers through this initiative will have the opportunity to strengthen the research that underpins the knowledge base for the profession, and equally to critique and challenge that research.

This collaborative process allows researchers and teachers to contribute to guides connected to their area of expertise and to interact and network with other teacher practitioners in the same field across different schools and regions. The process is dynamic, enabling expertise to develop between researchers and teachers, linking theory and practice. This participatory process allows academics to contribute to guides in their area of expertise and to interact with teacher-practitioners in the same field. Thus collaboration is between researchers and teachers, who possess a dynamic expertise between them; it links theory and practice and aims to overcome a major barrier whereby research resides behind university paywalls in academic journals which are read almost solely by other academics. Such paywalls prevent teachers having their practice informed by research, unless they can access the university databases which normally requires payment of course fees. In contrast, the vision of MESH is to be free at point of access and provide an overview of educational research on a given topic with reference to previous published research, thereby mapping the terrain to inform teachers' professional practice.

Next steps moving forward

The use of knowledge management principles are well known in other sectors, public and private, and now need to be robustly developed in the education sector. The goal is to develop new ways of working, now made possible by digital technologies, which can address long-standing improvement challenges faced by educators. One solution is an initiative involving educators worldwide in building a quality assured wikipedia of professional knowledge for teaching. The MESH translational research initiative is quality assured and tested with teachers and provides advice linked to research and evidence. MESH uses low costs digital technologies and an innovative knowledge mapping approach to provide personalised, research-based advice and 'just in time' learning to support teachers in

extending and deepening their professional knowledge, accessible with a mobile device anywhere in the world.

In addition, MESHGuides are also proposed as one way of providing an evolving international standard for publishing research summaries for teachers. This is only one way of addressing teachers' growing desire to engage with research, and we acknowledge that there are other providers, such as CUREE, Cambridge Primary Review Trust, EEF Sutton toolkit, also tackling the same challenges. However, we believe that the research summaries (MESHGuides) together with the feedback from teachers through the MESHConnect network may provide a unique knowledge mobilisation strategy that empowers teachers to harness research for their own professional practice.

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Bio of Authors (50 Words each)

Dr Sarah Younie is a Reader in Education at De Montfort University and has undertaken international and national research for the EU, DfE, BBC, HEA and JISC, local authorities and charities. She has worked as a teacher and researcher in secondary schools, universities and as the UK Chair of a National Subject Association she has conducted national research, including submitting evidence for the Parliamentary Select Committee Inquiry into Education. She has published a number of books on educational technologies and learning to teach.

Dr Richard Procter is a Lecturer in Education at De Montfort University. Previously he has worked as an educational researcher and as a secondary school teacher. He has carried out a number of research projects in the areas of assessment, learning how to learn and educational technology.

Jon Audain is a Senior Lecturer in Education (Information and Communication Technology and Music) at the University of Winchester. He is an experienced primary teacher, researcher and Fellow of the College of Teachers and the Royal Society of Arts. He has written a number of books on the use of ICT in the primary classroom.

Jonnie Noakes is Head of Teaching and Learning at Eton College. He has also been the Director of the Tony Little Centre for Innovation and Research in Learning at Eton since it opened in 2015. An English teacher with 30 years' experience in the classroom, he has held a wide variety of leadership roles in schools, both pastoral and academic, as well as in school governance. He is on the board of BrainCanDo, a charity which conducts research in the five schools that are part of the Grey Coat Hospital and United Westminster Schools Foundations.

Geraldine Davies has over 35 years' experience in education and is currently the Principal of The UCL Academy which opened in 2012. Sponsored by UCL, one of the world's top universities, The Academy follows an innovative STEM focused, Connected Curriculum based in a state of the art building in Camden.