

This paper was downloaded from

The Online Educational Research Journal
(OERJ)

www.oerj.org

OERJ is an entirely internet-based educational research journal. It is available to anyone who can access the web and all articles can be read and downloaded online. Anybody can submit articles as well as comment on and rate articles. Submissions are published immediately provided certain rules are followed.

PIMS –a model providing timely research for research informed policy making?

Marilyn Leask and Christina Preston

Faculty of Education, Sport and Tourism, University of Bedfordshire, Bedford, UK

Mirandanet, Surrey, UK

Summary

International organisations such as the OECD and Unesco now publish comparative data on educational performance and the consequent challenge for any country is to ensure that changes in the education system actually result in improved outcomes.

Increasingly the research base for educational practice is scrutinised.

However, for educational policy and practice to be evidence based, educational researchers need to provide timely relevant research.

This article proposes a model of research using concept mapping with policy makers and practitioners working as co-researchers. The model meets the challenge rapid research for selected topics. It was developed initially for pragmatic reasons in response to a requirement from a UK government agency for rapid research on digital technologies. The acronym PIMS indicates key features of the model:

- P –policy makers and practitioners are involved as co-researchers
- I – Intensive data collection takes place with simultaneous debate and analysis in a community of practice context
- M – multidimensional concept maps (MDCMs) are used to gather and shape ideas created through debate
- S – standard research methods and tests are used to complement the above.

This article reports on the research approach developed and tested out on two research projects funded by a national agency.

Introduction: achieving research informed policy and practice

Recent OECD surveys of improvement strategies in a number of leading education systems now demonstrate there is an expectation that research will be used to inform decisions about policy and practice (OECD 2003, 2007 a,b; 2009 Davies et al 2000; Research information Network (2009), Leask 2004a,b; Leask & White 2004; Oakley

2003). This is part of an international move to more effective knowledge management. Throughout the latter part of the 20th century and the early 21st century, knowledge management became increasingly important to many organisations both government agencies and private companies (Henley, 2008a,b; Oakley, 2003,). Consequently new understandings about the generation of knowledge as well as new research related techniques and approaches were developed (Collison and Parcell, 2006; Davenport and Prusak, 1998; GTCE, 2006, 2007; Newman and Holzman, 1997; Oakley, 2003; Leask and White 2004; Morris and Andrews 2005; US Department for Education 2007, 2011; Zeichner 2008).

Research informed policy and practice is however an elusive goal for the education sector in England. Traditionally in England anecdotal evidence has been a sufficient basis for educational practice with educational policies driven by ideology rather than solid evidence and the incoming Conservative/Liberal Democrat Coalition quickly dismantled structures set up by the previous administration which had been intended to provide access to evidence for professionals (these included: Teachers' TV, the Teacher Training Resource Bank, the Qualifications and Curriculum Development Agency, the British Education Communications and Technology Agency).

For educational policy and practice to be evidence based, educational research methods need to be capable of providing timely, significant and affordable research which is relevant to the educational challenges of the day (Newman et al 2004; Leask and White 2004; Proton Europe 2007). In the UK recent initiatives which bring a focus on models of research practice is that UK university researchers will be required to demonstrate the impact of their research in the national research assessment exercise for 2014. There are already considerable funds available to support knowledge transfer between researchers and research users (Research Councils UK 2010, HEFCE 2008; 2011).

How educational research is funded and reported, the research instruments used and who undertakes it could reasonably be expected to be key elements of any national improvement strategy for education, together with an understanding of how professional knowledge is created, tested and shared and the levers for change in any educational system. Yet an examination of many government generated papers on strategies for improving the quality of teaching shows no or little acknowledgment of these factors (Australian Government 2005, 2007, 2010; China Education and Research Network 2000; Howard Partners 2005; Indian Government 2010a, b; Leask 2010a,b,c; McKinsey 2007; Ming-Yuan 2006; Unesco 2010a, b; US Department of Education 2006). Apart from the US establishing of the What Works Clearing House, little reference can be found to strategies for building an evidence base for educational practice yet few would disagree that the quality of education has a key impact on all economies and provides the foundations for the societies of tomorrow.

In England, under the Labour government 1997-2010, there was an attempt to change the tendency for educational policy to be driven by the political ideology of the governing party rather than solid evidence.

A National Educational Research Forum (NERF) was established (Morris and Andrews 2005) and at the Training and Development Agency for schools (TDA) a team was tasked with identifying the evidence base underpinning teacher training and making it available via the web. During 2002-2006, a cross-government panel met under the auspices of NERF to identify and support models of educational research capable of underpinning government policy (Morris and Andrews 2005; Leask 2004a,b; Leask and White 2004;). However, reviews of educational research funded by government and carried out by academics showed few studies with findings significant enough to influence policy (Davies et al 2000; Gough and Elbourne 2002 and Leask 2004; Newman et al 2004).

The problems were easy to identify - apart from a few notable exceptions, an examination of the work submitted for the national 2001 Research Assessment Exercise by the TDA team showed that what was valued by educational researchers was generally small-scale action research.

This sort of research does not provide a secure foundation for the formation of policy and in addition models of reporting are too slow and inconsistent to be of value. This inconsistency of reporting meant that attempts supported by government to develop systematic review processes for education similar to those in the Cochrane Collaboration - a self sustaining independent body synthesising evidence for practice through collaborative networks of medical practitioners around the world - did not become mainstream. Examples of education systematic reviews funded by the UK government can be seen on www.eppi.ioe.ac.uk (Gough and Elbourne 2004).

What was clear from NERF work was that for educational policy and practice to be evidence based, educational researchers needed to move beyond the small-scale action research which had become the dominant paradigm (and which is a misinterpretation of Stenhouse's seminal work on action research see Leask 1988 and Hopkins 1989). For research to have impact on government policy, models of research are needed which provide timely and affordable research relevant to the educational challenges of the day and sufficiently robust to provide a foundation for national policy.

This article proposes a model of research capable of meeting that challenge-known as PIMS:

- P –policy makers and practitioners as appropriate, are involved as co-researchers
- I – Intensive data collection takes place with simultaneous debate and analysis in a community of practice context
- M – multidimensional concept maps (MCDMs) are used to gather and shape

ideas created through debate

- S – standard research methods and tests are used to complement the above.

This model extends the Stenhouse tradition (1975) of teacher engagement in research and builds on concepts of emancipatory research more common in health research (Hanley 2005; Stuttaford 2004; Oliver 2002) and concepts of collaborative research (BBSRC 2011; Hopkins 1989; Leask and Younie 2001, 2002). Whilst the PIMS model as described here was initially a pragmatic response to a research funder's request for rapid research, the quality, depth and quantity of the data collected in comparison with traditional focus groups and interview methods led to a detailed analysis of the approach and the proposals put forward in this article.

Research brief

The government agency funding the research asked for standard methods of data collection such as documentary analysis, interviews and focus groups to be used to gather data from a sample of school and further education teachers in England.

Questions to be answered through focus groups were focused on:

- digital technologies e.g. What are the characteristics of effective technology-based tools and digital resources? For whom? In what circumstances?;
- non-digital technologies, e.g. What are the characteristics of non-technology-based tools? For whom? In what circumstances?;
- processes e.g. What processes do educational establishments go through when deciding what new tools and resources to adopt?;
- challenges e.g. what are the key challenges faced by practitioners in doing their job well? and;

- the future e.g. Imagine the future – could new solutions be created? What are their characteristics (see Figure 1, Research questions overview).

The research strategy

The research strategy adopted was a mode of inclusive research methodology intended to lead to enriched qualitative judgments about the future of digital tools and resources. Practitioners were to be agents in the research rather than subjects as in this way added value is gained from the research as those involved learn from each other (Stenhouse 1975). Built into the research was the expectation that the expert participants would not only draw together existing knowledge from diverse contexts but that they would create new knowledge and disseminate the findings within their own communities, thus creating an immediate channel for change.

Ethics

The approach to ethics was approved by the Brunel University Ethics committee and the researchers adhered to the British Educational Research Association Ethical guidelines (<http://www.bera.ac.uk/publications/guidelines/>). Respondents all had the opportunity to discuss and comment on the final report before it was released through a Web 2.0 community workspace established on the local government communities' site (www.idea.communities.gov.uk) to allow for sharing of responses to the draft research findings.

Sample

The participants (teachers and lecturers) were selected from educational institutions that were leading the integration of ICT into educational practice as well as ones that were struggling. The data had to be gathered in a matter of days as the ability to deliver a

report within weeks was a critical requirement. The researchers therefore made the decision to identify leading practice through selecting a stratified sample of respondents via an invitation to members of online communities of practice for specialists in digital technologies and education, and to work intensively in structured concurrent focus groups with these respondents over a 48 hour period. The sample of nearly 50 respondents from innovative institutions was identified within 24 hours of an invitation being circulated to the professional online communities. Details of the operation of online and offline communities of practice is provided by for example, Wenger (1998); Preston (1999); IDeA (2006, 2008, 2009). Staff from institutions that were struggling to integrate ICT into educational practice, were also required for the sample, and were selected through reference to local authorities. Because of the potential sensitivity of the information this group was interviewed separately using standard semi-structured interview and focus group techniques.

Methods

In addition to the standard methods required by the funders, two additional and innovative research techniques were employed in the research into digital technology issues: the use of **multimodal mapping** in focus groups as a scaffold for collaborative data collection (Preston 2007, 2008, 2009, 2010), and explicit efforts to build an **informal community of practice** to enrich the collaborative judgment process for the entire system (Lave and Wenger 1991; Wenger 1998; Wenger et al 2002; Preston 1999; Leask and Younie 2001).

The design of the programme for the 48 hour concurrent focus groups was based on the combined experience of the authors who, since the early 1980s, have been researching, developing and implementing innovative professional development designs

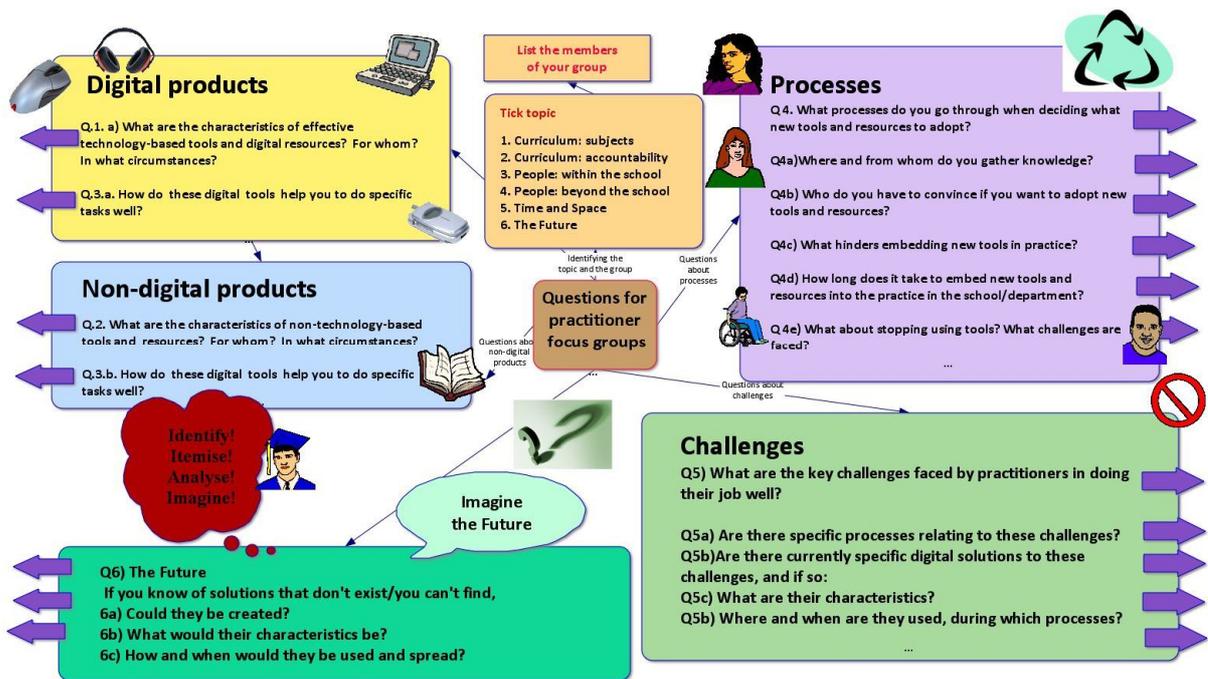
that address change issues within the ecology of the whole education sector (Preston 2004a 2004b; Leask and Younie 2002; Preston and Cuthell 2007; Leask et al 2008, 2009; Davis et al 2009a,b; Leask 1988).

Multi-dimensional concept maps (MDCMs) within the focus groups

A comprehensive dataset of Multi-dimensional concept maps (MDCMs) was derived from the workshop. The term ‘multidimensional’ refers to concept maps that might be multimodal, multimedia, multilayered and multi-authored (Preston 2008, 2009, 2010).

The use of the MDCMs within the focus groups was designed to generate collective professional judgements. For all workshops except the last summary workshops where concept mapping software was used, MDCMs were paper based with each focus group being provided with a large blank concept map with the research questions in the centre (See Figure 1). It was a deliberate decision to give, from the start, an overview of what would be covered by the whole project to those collaborating in the research.

Figure 1 research questions overview

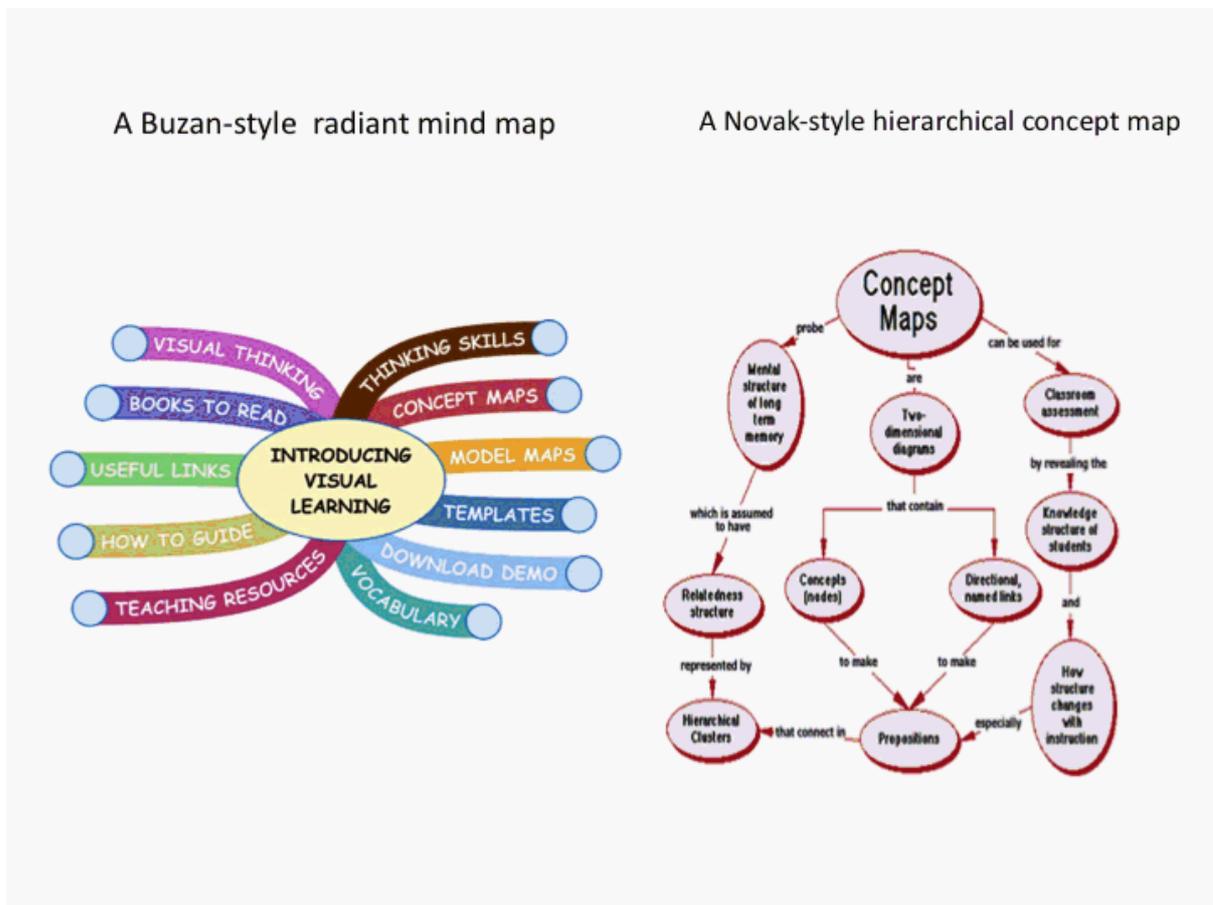


Workshop discussions were recorded and later transcribed by a designated note-taker/observer and checked against the data on the concept maps after the event. A workshop member built the map under direction from the group. Each participant had ‘post-it’ notes to use to record additional ideas during the discussion. The ‘post-it’ notes were placed on the concept map as the discussion developed and so prompted further discussion and refinement of ideas with moving of the ‘post-its’ to create themes and nodes for the concept maps. When the group was satisfied with the map, the ‘post-its’ were glued into place and the map kept for the detailed analysis to come. This process created the MDCMs.

The intention was to ensure that all responses were captured and that where appropriate, key ideas were debated, discussed and fully explored. So in the concurrent focus groups, data collection was through several concurrent activities (See Table 2). The two main approaches to concept mapping illustrated in Figure 2 and are radiant ‘mind maps’ trademarked by Buzan (1993, 2002, 2007) and hierarchical ‘concept maps’ associated with Novak (Novak and Godwin 1984; Novak and Canas 2006; Canas and

Novak 2007).

Figure 2 Mind map and concept map



Concept mapping software had been distributed to the participants beforehand and participants who had expertise in the software package were invited to lead the mapping exercises when the software was being used. The originality of the maps was a consequence of the freedom that the groups were given in composition.

Familiarity with the software beforehand is recommended for those considering this approach. None of the groups used all the affordances of the software although one group used the linking arcs and one group one used clip art and animation. The latter affordances gave the group's map a distinctive style that was exploited in a presentation to the whole group. One group used the Novak-style concept mapping feature which in this instance did not seem to facilitate group exchange of ideas in the same way as a

radiant map but there may have been other factors at play which meant this group recorded less on the digital map e.g. lack of familiarity with the software.

The focus group composition

For some research questions the focus groups were constructed to contain either primary or secondary or FE expertise whilst for other questions the groups were mixed. All groups had members with a range of experience from newly qualified to experienced teachers who acted as leaders and observers.

Policymakers requested engagement in selected elements of the programme and this provided an unexpected positive dimension to the research process as they were able to gain rapid feedback on the key issues which led them to commission the work. This engagement could be risky and lead to judgments based on impressions but this risk seemed acceptable given the topic matter for this research (current practice and futures thinking around digital technologies in education).

Collaborative research

Building on Adler and Adler (1987) and Hopkins (1989), Table 1 provides a framework for understanding the different ways practitioners can be engaged in research and for identifying the locus of control in research projects. The ‘Collaborative Member Co-researcher (CMCR), with full engagement in the research is what was expected of participants in the PIMs approach. This fits with the concepts of emancipatory research (Hanley 2005; Stuttaford 2004; Oliver 2002) rather than the traditional ‘Peripheral Member Researcher’ role where the participant provides data but is not engaged in the whole project. Central to the PIMS model is the development of a community of co-researchers working together making collaborative analytical judgments.

Table 1: Practitioner engagement in research

The role of the researcher	The role of the teacher as learner	The impact on policy and practice
Peripheral member researcher (PMR) Adler and Adler 1987	The teacher as the subject of the research is not engaged in the process and is unlikely to read the subsequent report	No impact in policy or practice
Active member researcher (AMR) Adler and Adler 1987	The teachers are invited to comment on research findings based on their participation in a MDCM exercise	The teachers achieve individual and group insights into their own learning and into the value of reflection on practice.
Complete member researcher (CMR). Adler and Adler 1987	The teachers negotiate their own topics for action or practice-based research that address their current challenges and are planned to impact on their policy and practice.	Impact on teacher's practice and possibly on their institutional development plan depending on the topic and status of the teacher.
Collaborative co-researcher members (CCMR) Leask in Hopkins (1989) Sachs (2003) Zeichner (2006-2008) Preston (2008)	The MDCM becomes one of the data collection tools that underpins direct engagement and transfer of explicit and tacit knowledge between teachers as CCMRs, academic researchers and policymakers through the collaborative creation of multi-dimensional concept maps	The open sharing of ideas through PIMS research environments supports exploration of unforeseen options and deeper understanding between practitioners and policymakers and reports which are grounded in practice and policy considerations. This evidence can be used to have professional impact on practice and policy.

Community of practice context

Where data collection methods differed from the norm was in the recording of data from focus group discussions the concept maps which were visible to all. This meant the whole group could see the patterns emerging. It was observed that this allowed groups to categorise data, to probe experiences and ideas in a systematic structured way and to come to shared judgments on emerging issues.

The communication between the group members was lively and accompanied by a variety of semiotic approaches. During the mapping process, for example, the participants' gaze was directed towards the maps. Hand gestures, facial movements and body language were used to convey where ideas should be placed on the map as much as precise vocabulary of place and movement. Some participants liked to stand at the screen to make a point whereas others were happy to gesticulate from a distance.

Building a community of practice for teachers as co-researchers

Creating an atmosphere within the space of a weekend in which nearly fifty professionals learnt to trust each other to work in an open, collaborative but challenging environment needed some forethought. Apart from seeing to their physical wellbeing with good food and accommodation, the participants were encouraged to feel that their intellectual contribution was respected and that the results would advantage them as well as the wider profession. It was made clear that the participants were to be co-researchers rather than subjects of research.

Between the concurrent focus groups, a series of team building activities was organised using humour and team work to develop the sense of community and to increase the probability that the five groups would trust each other in debate and discussion. These group activities included: a hat-making competition for King William's first garden party; articulating an incontrovertible theory about the domestic retention of the second sock that would survive heckling; and, the composition and performance of a song or poem praising the teacher as hero/heroine. Each group also choose a soft toy mascot that was sometimes used as a conch in the Lord of the Flies tradition to denote the current speaker, and sometimes thrown at members of the group who overran their time.

More serious activities in the mode of a MirandaMod , a themed 'unconference,' resulted in each participant's two-minute account of their best and worst learning experience in ICT CPD and their Eureka moment in the teaching of digital technologies. These critical incidents (Wragg 1994; Preston and Cuthell 2007) generated videoed research material.

Data analysis

Analysis of data was undertaken using standard protocols established for grounded theory approaches (Leask 1988 provides a detailed explanation). In summary, categories are identified from the data, data are analysed with respect to the categories, categories are considered saturated when responses from a range of respondents are identified relating to the category. Outliers are examined for relevance and further data are collected to probe outliers if required. The research questions were used to provide a framework for data collection not to constrain the analysis process.

MDCM data analysis

The researchers drafting the final full research report for the funder gained from the way in which the data collection was organised because they were able to begin at a higher level of analysis than would have been possible if single answers to 50 questionnaires had had to be analysed first. The organisation of the data around key concepts on the MDCMs backed up by the observers' notes and discussion transcripts from the focus groups allowed the lead researchers to provide a short, top-level report in a short space of time. In a triangulation exercise the findings from the groups attending the workshop were later tested with staff in institutions which were experiencing difficulties with the adoption of new technologies and with international colleagues.

There were naturally some disadvantages to the method. In particular, the MDCM model generated more quality and detailed data than was anticipated and hence the costs of analysis were considerably more than for traditional methods. Following the two day intensive workshop, six weeks was needed for analysis and writing of a final report with time for extra data collection for triangulation purposes added to that.

MDCMs as a tool for co-researching

An unexpected outcome of the use of MDCMs was not only the speed of data collection and the depth of the data but that the use of the MDCM seemed to provide a very dynamic knowledge exchange/continuing professional development (CPD) process stimulated by the visual display of the MDCMs. Through the collaborative construction of the MDCMs policy makers were able to hear discussions revealing fine grained knowledge that, because of the need to synthesise data, is left out of research reports. The process seemed to allow for complex and nuanced understandings to be articulated in the group and for these to be recorded in detail.

Building concept maps using flip chart paper and post-its appeared to be a quicker process than using software with many contributors able to place their contributions on the poster at the same time. The paper based model appeared to generate more fine grained data more quickly than using software.

The style of map used seemed to have an impact on the quality and quantity of data collected. Buzan and Novak have differing views about how their maps represent cognitive processes. Buzan postulates that the brain works from the centre in branching thoughts and that radiant maps facilitate thinking because they follow brain patterns. Although he promotes this notion with energy there does not appear to be any evidence to support his theory. Novak, on the other hand, engaged in much classroom testing. His model for the use of the maps in classrooms, is that the teacher asks learners to reconstruct what they have been taught in a way that makes sense to them, that the teacher uses this process to expose misunderstandings and aid recall. The method is particularly helpful in learning science and maths concepts. In addition he advises teachers to explain in detail how to create a map so that the students know what is expected and can gain high marks when the map is scored.

Neither of these approaches was appropriate for the research project although the participants were shown the variety of maps that could be created. The participants were in fact brainstorming and then categorizing and analyzing information that they had generated themselves from their own experience.

A notable use of a freer model to concept mapping was developed with pupils from 8-14 years in a project called Computers in my World the Impact2 study, for investigating pupils' conceptions about networking (Harrison and Comber 2002; Mavers, Somekh and Rosterick 2002; Pearson and Somekh 2003).

For this digital technologies research where the PIMS approach was developed, the paper-based MDCMs seemed particularly valuable at the brainstorming phase of the research – with all ideas being able to be recorded whereas the digital maps seemed particularly useful at the synthesizing stage where core ideas were sought. This may due simply to the speed with which ideas could be contributed to the paper-based MDCM.

The use of the MDCMs approach seemed to act both to build knowledge collaboratively and to help the group assess their learning progress. The teachers working in their focus groups were expressly told to use the potential of mapping to illustrate the links between their concepts in any ways that made sense. They were also encouraged to change the map as they progressed and as new ideas suggested different groupings (Preston 2007; Preston 2010). In the case under study, the MDCMs method was used in order to challenge the participant co-researchers to use a collection tool that exploited non-linear, multimodal and collaborative communication processes because these were considered appropriate for research which was exploring potential changes in teaching and learning. Observational data from the focus groups indicated that teachers were empowered as active co-researchers analysing the evidence as their groups collaborated and making collective judgments based on shared information.

An additional benefit of the visual mode of recording information was the stimulation to create some valuable and detailed listings of the e-tools and effective approaches and barriers to the use of ICT. The detailed discussions behind these concepts were not always sufficiently recorded on the map so it was important to set the written transcript of the discussions alongside the maps.

Overall, the groups' coherent and energetic presentations of the outcome of their work were evidence that mapping had been a professionally stimulating process. During presentations feeding back work from the focus groups to the whole group, the MDCMs were used as aide-memoires with presenters stopping to ensure that the ideas of the whole focus group had been represented and discussing which ideas should be expounded in detail and which ones required just a mention. The visual display meant that the whole group had a holistic picture of the focus group findings and were able to intervene by pointing at particular branches to initiate a further debate, ask a question or make a comment. There was a strong sense in the reporting back from all the focus groups that members of the focus group were not just on task but also engaged with the elements of the debate from different perspectives.

Discussion of the PIMS model

If the PIMS model is to be used as a research tool questions about the reliability and validity of the data need to be addressed. However, these are the same questions that need to be addressed for any models of emancipator/participatory or democratic research where there is an intention to empower those contributing to the research to be co-researchers and contributors to the data analysis

Table 2 lists factors others may wish to consider in applying the PIMS approach.

These notes come from post-hoc analysis of the data collected and analysis of participants' feedback on the concurrent focus group process

Table 2 Factors to consider in applying the PIMS approach

People	
Staffing required	Overall numbers of staff hours used for this method were similar to traditional focus group staffing (two staff, one managing the group, one observing and recording). However the concurrent focus groups carried out over 48 hours for this research, each required a leader with the role of co-ordinating the discussion, keeping to timings, ensuring all contributed, and a recorder ensuring that what was recorded on the MDCM was accurate and acceptable to the group and that key points of difference, points of strong agreement and so on were recorded. All involved had a co-researcher role: contributing data and shaping, analyzing and checking for validity. In the case under study, many participants had research training as part of their post-graduate study programmes and so understood the issues and were able to take on lead roles.
Respondent sample	The appropriate respondent sample has to be determined by the topic. In the case under study policy makers and practitioners were included together in selected focus groups where the questions being discussed indicated there would be benefits in direct knowledge transfer between the groups. This avoids the "lost in translation" risks with traditional research methods and was appropriate for this study where ideas were being captured. Those invited to the concurrent focus groups were identified as 'innovators' and 'early adopters' (Rogers 1983). Most were members of existing communities of practice e.g. international lead thinkers in ICT in education – the MirandaNet network (www.mirandanet.ac.uk) or other professional networks. In the case under study, the respondents were chosen on the basis of their primary, secondary, FE and SEN specialist knowledge and to ensure a range of experience from newly qualified teacher to head teacher to teacher educators both university and local authority based. Respondents were also drawn from the private and public school sectors, from all regions of the country and to provide gender balance.
Grouping	Grouping for the focus groups is dictated by the topic and purpose. If the goal is to test the tacit knowledge of the practitioners in the light of the constraints of the policy maker then a combination of practitioners and policy makers would seem appropriate. If the goal is to identify concerns with a new policy then it may be appropriate for the practitioner group to create a MDCM of the issue together and then discuss this with the policy makers.
Processes	
Task setting	In the case under study the research questions were summarized (Figure one) and placed in the centre of each of the paper based flow charts. The purpose of this was to engage all respondents in the whole project from the beginning in order to keep discussions focussed on specific questions.
Quality Assurance	<p>Triangulation : The ideas from the concurrent focus groups were triangulated through traditional focus groups in a sample of schools which included schools leading with technology and schools experiencing difficulties with embedding technology in the curriculum. Peer scrutiny of the outcomes by an international expert panel also provided an element of triangulation.</p> <p>Reliability and validity: the <u>S</u> part of the PIMS method is a reminder that standard research methods e.g. documentary analysis, interviews, surveys, were used to ensure standards for reliability and validity are met. Intra-judge reliability processes need to be in place and so on.</p> <p>Outliers/alternative viewpoints: Clearly the workshop leaders need to be aware of the possibility of 'group think' occurring and valuable insights being lost. Ensuring this does not happen is part of the training required for workshop leaders.</p>
timing	The concurrent focus group approach means that data can be gathered quickly. In the case under study, using traditional focus groups research methods would have extended the process by several weeks as a minimum.
Texts	
recording	<p>Several levels of recording are suggested:</p> <ul style="list-style-type: none"> • By individuals through post-it notes either before and during the discussion and after the session • Recording of the discussion by a recorder through notes or a tape or video recorder • Creating the map using the post-its and including new ideas following the discussion.
Environment	
Physical and emotional environment	<p>Careful attention needs to given to the environment in which the work will take place. Power relationships and sensitivities need to be considered so that the group work is as effective as possible. Team building exercises were included in the case under study.</p> <p>Trust between group members is essential to the PIMS approach and explicit recognition was given in the case under study to the communities of practice that respondents worked in already, coupled with a request to work in a similar collaborative knowledge building community throughout the 48 hours.</p>

Analysis of data gathered by the observers in the focus groups indicates that a principal value of the MDCMs, both in paper and digital form seemed to be the positive scaffolding afforded to the group activity leading rapidly to deep probing of issues. Being able to see the shared record of discussions at a glance unlike a linear report seemed to allow the group members to quickly develop shared understandings of their task. There was evidence that previous conclusions were revisited and further developed as more information was shared.

The decision made to share the whole concept of the research project with respondents/co-researchers from the beginning via a summary sheet, instead of the research questions being revealed in a controlled way at each session appeared to work well with respondents/co-researchers quickly focusing on the session topic. The summary sheet allowed all participants to see from the start what the direction of the complete research project was intended to be.

Clearly the model has limitations as well as strengths. It would not for example be appropriate to use the PIMS model when sensitive data are being sought, or where confidentiality and/or individual contributions are required.

Whilst the PIMS model can be applied to any topic, because of the need for trust in the focus groups it seems to be particularly relevant for drawing on the knowledge of communities of practice i.e. groups with shared knowledge and strong shared interests. Working with existing online communities allows a representative sample of respondents to be identified quickly and at low cost. The approach invites professional communities, for example, subject associations or specialist groups to nominate members to be engaged in research. Such linking of practitioners and policy makers in online communities of practice has been pioneered in local government in England through the provision of an e-infrastructure supporting online communities of different

types which serve different purposes. Some of the communities connect policy makers with front line practitioners, others are for front line practitioners only (see Public Sector communities www.communities.idea.gov.uk).

Conclusions

The work reported in this article is intended to illustrate the potential for researchers to work in partnership with policy makers and members of professional communities of practice in rapidly creating and disseminating new research-based knowledge. The article also highlights ways in which digital technologies can support new forms of knowledge creation and transfer (See Leask 2011, 2012 for further details). Research methodologies will need revising to take advantage of the new opportunities for data collection and instant analysis that digital technologies provide.

The value of education professionals of being involved as co-researchers considering issues that are central to their interests has long been established (Sachs 2003; Schon 1987; Stenhouse 1975; Leask 1988; UK DCSF 2006) but the potential of these models to engage practitioners in research of significance to practice is largely unrealized. In planning improvements in education systems, governments might usefully pay attention to methods of commissioning research and apply value for money criteria for the research methods chosen. There is a history in England of educational research being commissioned from companies with no stake in the education system and whilst it could be argued they may provide greater objectivity, the opportunity costs to the whole education system of using such companies are considerable. For example the new knowledge created from the research is held outside the education system; those involved have no obligation to ensure their research has impact – unlike university staff who in the UK, Australia and New Zealand are required to demonstrate that their

research has impact (HEFCE 2008, 2011); such organisations may have no commitment nor leverage in improving the quality of the education system.

The value of this loss of knowledge and loss of impact to society of such restricted commissioning approaches can be many times that of the original contract. For example educators in schools, local authorities or universities teaching and who are delivering initial teacher training (ITT) and continuing professional development (CPD) as well as those who publish texts and professional and academic articles have potential as key change agents able to leverage change in the system – they can also of course, act to inhibit change. However excluding these stakeholders from major research projects may mean that the teaching of pupils and the next generation of teachers is not influenced as it could be by the new research findings and that opportunities to build educational research capacity are lost. Raiker (2011) in her research on teacher training in Finland discovered the value to the system of having research active school-based teacher trainers in integrating research and theory with practice.

This paper puts the case for a model of research which provides a way of engaging teachers and other educational practitioners as researchers on significant projects and it seems to have yielded several benefits over traditional research models, such as:

- timeliness and cost effectiveness of data collection. Much policy making is done within a short timescale. This model closes the gap between policy and practice and allows both for rapid data collection from front line professional as well as for scrutiny of draft policy ideas by practitioners with a range of expertise and experience
- engagement between practitioners, policy makers and researchers in the analysis at a deep level of practice and potential for practice to change

- volume of detailed data of the sort that could be used to influence practice i.e. focused on practice rather than just top level analysis of key issues
- a community of practice building process providing opportunities for further generation and analysis of ideas
- high quality collaborative judgments improved by expert scrutiny from multiple perspectives.

The potential for the engagement of subject specialist communities in these ways of working is obvious as is the opportunity for collaborative group judgments as opposed to individual judgments being accumulated in a database of research-based practice. In this context there is also scope for the accreditation from certificate to masters' level of professionals who take part in the research process.

With an increasingly highly qualified workforce, many of whom have undertaken research as part of their post-graduate study, and with digital technologies supporting low cost knowledge exchange and peer challenge, having researchers come in from outside the profession to 'do' research on educational practitioners may be less effective in terms of cost, in terms of quality of data gathered and in terms of swift dissemination of results than using the skills within the profession. There is always a role for peer challenge by outsiders – challenging norms, asking probing questions, testing the data, but, we would argue, based on evidence of working with teacher researchers, pupils, academics and policy makers over twenty five years, that these co-researching models engaging the full range of stakeholders in the research means that deeper insights into problems and their solutions is gained more quickly and much more cost effectively.

References

- Adler, P. A. and Adler, P. 1987. Membership roles in field research. Newbury Park C.A.: Sage.
- Australian Government DEEW (Department of Education, Employment and Workplace relations) 2010. Quality Teaching. Canberra, Australia: Australian Government <http://www.deewr.gov.au/Schooling/QualityTeaching/Pages/Qualityteaching.asp>
- Australian Government 2007. Quality teaching. Curriculum Corporation. Canberra, Australia: Australian Government <http://www.deewr.gov.au/Schooling/QualityTeaching/AGQTP/Documents/QualityTeachers.pdf>
- Australian Government DEST (Department of Education, Science and Training) 2005. The emerging business of knowledge transfer: creating value from intellectual products and services. Canberra, Australia: Australian Government
- BBSRC (Biotechnology and Biological Sciences Research Council) (2011) Collaborative research <http://www.bbsrc.ac.uk/business/collaborative-research/collaborative-research-index.aspx>
- Becta 2010a. ICT Tools for Future Teachers. Becta, Coventry. Report produced by Leask, M. and Preston, C.
- Becta 2010b. The ICT CPD Landscape. Becta, Coventry. Report produced by Pachler, N., Preston, C., Cuthell, J., and Allen, B.
- Buzan, T. 1993. Mind Maps, Radiant Thinking. London: BBC.
- Buzan, T. 2002. How to Mind Map: the ultimate thinking tool that will change your life. London: Thorsons.
- Buzan, T. 2007. Buzan on mind maps for teachers: podcast provided for Editorial Two: An introduction to Multimodal Concept Mapping: approaches and techniques. Editorial. Reflecting Education: Fascinating cultural artefacts: multimodal concept mapping in teaching and learning: www.reflectingeducation.net/index.php/reflecting Editors C. H. Richardson and C. Preston. pp. 10-15.
- Cañas, A. and Novak, J. 2007. Theoretical origins of concept maps and how to construct and use them in classrooms: a new model for education. Reflecting Education:

- Fascinating cultural artefacts: multimodal concept mapping in teaching and learning: www.reflectingeducation.net/index.php/reflecting. Editors C. H. Richardson and C. Preston. London: WLE centre Institute of Education, University of Education. 3: pp. 29-42.
- China Education and Research Network 2000. Teacher Education In China (II) Remarkable Results of Reform and Development Of Teacher Education. <http://www.edu.cn/20010101/21924.shtml>
- Collison, C. and Parcell, G., 2006. Learning to Fly. London: Wiley.
- Davenport, T. and Prusak, L., 1998. Working knowledge. Boston, Mass.: Harvard Business School Press.
- Davies, H., Nutley, S. and Smith, P. (eds) 2000. What works? Evidence-based policy and practice in public services. Bristol, UK: The Policy Press.
- Davis, N.E., Preston, C., and Sahin, N. 2009a. ICT teacher training: Evidence for multilevel evaluation from a national initiative. British Journal of Education Technology (BJET). 40 no. 1: 135–148.
- Davis, N. E., C. Preston and Sahin, F. 2009b. Theoretical and evaluation frameworks to inform technology-related professional development for teachers, tested with evidence from a national study of ICT professional development for teachers. British Educational Research Journal.
- Gough. D., and Elbourne, D., (2002) Systematic Research Synthesis to Inform Policy, Practice and Democratic Debate. Social Policy & Society 1 no.3, 225-236
- GTCE (UK: General Teaching Council for England) 2007. Making CPD better - Bringing Together Research about CPD: Leaflet produced by Bolam, R. and Weindling, D from the full report GTCE, 2007b. London: GTCE. http://www.gtce.org.uk/publications/res_cpd/
- GTCE (UK: General Teaching Council for England) May 2006. Synthesis of research and evaluation projects concerned with capacity-building through teachers' professional development: Full research report. Report produced by Bolam, R. and Weindling, D. London: GTCE. http://www.gtce.org.uk/research/commissioned_research/cpd/synthesis_cpd_projects/

- Harrison, C., Comber, C. 2002. ImpaCT2 The Impact of Information and Communication Technologies on Pupil Learning and Attainment. London: Becta for DfES.
- Hanley, B. 2005 Research as empowerment? Report of a series of seminars organised by the Toronto Group. Joseph Rowntree Foundation Available at <http://www.jrf.org.uk/publications/user-involvement-research-building-experience-and-developing-standards>
- HEFCE (Higher Education Funding Council for England) 2011. REF 2014 Research Excellence Framework
http://www.hefce.ac.uk/research/ref/pubs/2011/01_11/
- HEFCE (Higher Education Funding Council for England) 2008. RAE 2008 Research Assessment Exercise
<http://www.rae.ac.uk/>
- Henley Knowledge Management Forum 2008a. Building and sustaining communities of practice. Henley, UK: Knowledge in Action. issue 07. Henley Management College.
- Henley Knowledge Management Forum 2008b. Sharing knowledge with other organizations. Henley, UK: Knowledge in Action. issue 08. Henley Management College.
- Hopkins, D. 1989. Evaluation for School Development. Milton Keynes: Open University Press.
- Howard Partners 2005. The emerging business of Knowledge transfer: Creating value from intellectual products and services, Canberra, Commonwealth of Australia, Department of Education, Science and Training.
- IDeA UK: Improvement and Development Agency for local government, 2009. Internal research report: Communities of Practice. London: IDeA.
- IDeA UK: Improvement and Development Agency for local government 2008. Knowledge Management Tools and Techniques: helping you find the right knowledge at the right time. London: Improvement and Development Agency for local government. <http://www.idea.gov.uk/idk/aio/8595069>

- IDeA UK: Improvement and Development Agency for local government
2006. Knowledge management strategy: board paper. IDeA internal document.
London: IDeA.
- Indian Government 2010a. National Council for teacher education: a statutory body of the government of India.
<http://www.ncte-india.org/publicnotice/invitation.pdf>
- Indian Government National Council for teacher education: a statutory body of the government of India 2010b. Awards to teacher educators in India
<http://www.ncte-india.org/teacheraward.htm>
- Lave, J. and Wenger, E. 1991. Situated Learning: legitimate peripheral participation.
Cambridge: Cambridge University Press.
- Leask, M. (2012) Research Impact and Dissemination in McArthur, J., Coe, R., Waring, M., and Hedges, L. (2012 forthcoming) (eds) Educational Research, Sage.
- Leask, M. (2011) Improving the professional knowledge base for education: using Knowledge Management (KM) and Web 2.0 tools. Policy Futures in Education Vol 9 Number 5 http://www.wwords.co.uk/pfie/content/pdfs/9/issue9_5.asp
- Leask, M 2010b. A National and International model for scaling up small scale educational research: country wide HEI/school collaborative networks? London: Brunel University <http://www.beds.ac.uk/departments/es/marilyn-leask/publications>
- Leask, M 2010c. Occasional paper No. 5 Networking the education workforce – getting order from anarchy. London: Brunel University.
<http://www.beds.ac.uk/departments/es/marilyn-leask/publications>
- Leask, M. 2004a. Using research and evidence to improve teaching and learning in the training of professionals - an example from teacher training in England. Paper presented at the British Educational Research Association Annual Conference, University of Manchester, UK. 16-18 September 2004.
<http://www.leeds.ac.uk/educol/documents/00003666.htm>
- Leask, M. 2004b. Accumulating the evidence base for educational practice: our respective responsibilities. Paper presented at the British Educational Research Association Annual Conference, University of Manchester, UK. 16-18 September 2004. <http://www.leeds.ac.uk/educol/documents/00003665.htm>
- Leask, M. 1988. Teachers as evaluators: a grounded model to project evaluation. MPhil Thesis. Cambridge Institute of Education.

- Leask, M. and White, C. 2004. Initial Teacher Training (ITT) Professional Resource Networks (IPRNs) - rationale and development. Paper presented at the British Educational Research Association Annual Conference, University of Manchester, UK. 16-18 September 2004.
<http://www.leeds.ac.uk/educol/documents/00003667.htm>
- Leask, M. and Younie, S. 2001. The European Schoolnet. An Online European Community for Teachers? A Valuable Professional Resource? *Journal for Teacher Development* Vol 5 no 2: 157-175
- Leask, M. and Younie, S. 2002. Communal Constructivist Theory: information and communications technology pedagogy and internationalisation of the curriculum. *Journal of Information Technology for Teacher Education*, Vol.10, Nos 1 and 2: 117-134.
- Leask, M., Blandford, S. and Preston, C. 2010. R U up 4 this? A proposal for developing practitioner knowledge from Achievement for All using 21stC ICT professional tools. *Special March*: 43-45.
- Leask, M., Preston, C., and Younie, S. 2008. Symposium: Web 2.0, communities of practice and new forms of engagement between policy makers, researchers and practitioners – where are the academics? BERA08, Edinburgh.
- Leask, M., Preston, C., Younie, S., Vainio, L., and Zernochova, L. 2009. Symposium: New Rules for Engagement: communities of practice, professional development and technology. *CAL 09: Learning in Digital Worlds*. A. Loveless. Brighton.
- Mavers, M., and Somekh, B. 2002. Interpreting the externalised images of pupils' conceptions of ICT: methods for the analysis of concept maps. *Computers and Education* 38: pp 187-207.
- McKinsey 2007. How the world's best-performing school systems came out on top. Report produced by Barber, M. and Mourshed, M..
http://www.mckinsey.com/client-service/Social_Sector/our_practices/Education/Knowledge_Highlights/Best_performing_school.aspx
- Ming-yuan, G. 2006. The Reform and Development in Teacher Education in China Beijing Normal University <http://www.icte.ecnu.edu.cn/EN/show.asp?id=547>
- Morris, A. and Andrews, R. 2006. Report on the working group on the National Centre for Evidence in Education Nef Working Paper 4.1.

<http://www.eep.ac.uk/nerf/publicationsnetworks/workingpapers/indexe42d.html?version=1>

Newman, F. and Holzman, L., 1997. *The End of Knowing*. London: Routledge.

Newman, M., Elbourne, D., and Leask, M. 2004. Improving the usability of educational research: guidelines for the reporting of empirical primary research studies in education. Roundtable discussion paper presented at the 5th Annual Conference of the Teaching and Learning Research Programme, Cardiff, 22-24 November 2004. <http://www.leeds.ac.uk/educol/BEID.html>

Novak, J. and Canas, A. 2006. The theory underlying concept maps and how to construct them. Florida, Institute for Human and Machine Cognition. <http://cmap.ihmc.us/publications/ResearchArticles/theoryunderlyingconceptmaps.pdf>

Novak, J. and Godwin, D. 1984. *Learning how to learn*. Cambridge: Cambridge University Press.

Oakley, A., 2003. Research Evidence, Knowledge Management and Educational Practice: early lessons from a systematic approach, *London Review of Education*. Vol.1, no.1: 21-34

OECD 2009. *Creating Effective Teaching and Learning Environments: First Results from Teaching and Learning international Survey (TALIS)* http://www.oecd.org/document/54/0,3343,en_2649_39263231_42980662_1_1_1_1,00.html

OECD 2007a. *Taking Stock of Educational R&D: Joint OECD-CORECHED International Expert Meeting* http://www.oecd.org/document/36/0,3343,en_2649_35845581_39379876_1_1_1_1,00.html

OECD 2007b. *Evidence in Education: Linking Research and Policy* http://www.oecd.org/document/56/0,3343,en_2649_35845581_38796344_1_1_1_1,00.html

OECD 2003. *New Challenges for Educational Research* <http://www.oecdbookshop.org/oecd/display.asp?sf1=identifiers&st1=962003031>
[P1](#) This report has two of the five reviews of educational R&D which CERI conducted in five countries: New Zealand, England, Mexico, Denmark and Switzerland.

- Oliver, M. 2002 Emancipatory research: a vehicle for social transformation or policy development. 1st Annual Disability Research Seminar Hosted by The National Disability Authority and the Centre for Disability Studies, University College Dublin. Dublin 3rd December 2002. Available at <http://www.leeds.ac.uk/disability-studies/archiveuk/Oliver/Mike%27s%20paper.pdf>
- Pearson, M. and Somekh, B. 2003. Concept-Mapping as a Research Tool: A Study of Primary Children's Representations of Information and Communication Technologies (ICT). *Education and Information Technologies* Vol 8, no 1: pp5-22.
- Preston, C. 1999. Building Online Professional Development Communities for Schools, Professional Associations or LEAs. *Learning to Teach using ICT in the Secondary School*. M. Leask and N. Pachler. London and New York, Routledge.
- Preston, C. 2004a. Teachers as lead learners: the importance of building professional networks. Friesland Chapter. Noordelijke Hogeschool, Leeuwarden, Friesland.
- Preston, C. 2004b. Learning to use ICT in Classrooms: teachers' and trainers' perspectives : an evaluation of the English NOF ICT teacher training programme 1999-2003. London: MirandaNet and the Teacher Training Agency www.mirandanet.ac.uk/tta
- Preston C. 2007. Multimodal concept mapping in teaching and learning. 'Fascinating cultural artefacts: multimodal concept mapping in teaching and learning'. Editors Howell Richardson C. and C. Preston *Reflecting Education* London: The Centre for Work-based Learning for Educational Professionals (WLE), Institute of Education, University of London www.reflectingeducation.net/index.php/reflecting
- Preston, C. 2008. A multidimensional framework for analysing concept maps; Conference Proceedings. *Concept Mapping - Connecting Educators*. Third International Concept Mapping Conference, Estonia and Finland.
- Preston, C. 2009. Exploring semiotic approaches to analysing multidimensional concept maps using methods that value collaboration. *Handbook of Research on Collaborative Learning Using Concept Mapping*. P. Torres and R. Marriott. Hershey, Pennsylvania/USA, Information Science Reference.
- Preston, C. 2010 unpublished thesis Understanding how the multimodal analysis of multi-dimensional concept maps can provide insights into teachers' changing

- learning priorities: three case studies of CPD in digital technologies: Doctorate in Education, Faculty of Culture and Pedagogy, Department of Learning, Curriculum and Communication, Institute of Education, University of London.
- Preston, C. and Cuthell, J. 2007. The Perspectives of Professional Educators' on ICT CPD: Past, Present, Future. London: NAACE, MirandaNet Fellowship, WLE, Institute of Education, University of London.
- Proton Europe 2007. Experiences on the US knowledge transfer and innovation system. Proton Europe Innovation from Public Research http://www.proinno-europe.eu/NWEV/uploaded_documents/US-knowledge-transfer-innovation-system.pdf
- Raiker, A. (2011) Finnish Teacher Training School: principles and pedagogy. Bedford: University of Bedfordshire available at <http://www.beds.ac.uk/news/2011/jul/110713-Finland>
- Research Councils UK 2010. Knowledge Transfer Portal. Swindon UK: Research Councils. <http://www.rcuk.ac.uk/kei/ktportal/Pages/home.aspx>
- Research information Network (2009). Communicating Knowledge: how and why researchers publish their research findings. <http://www.rin.ac.uk/our-work/communicating-and-disseminating-research/communicating-knowledge-how-and-why-researchers-pu>
- Rogers, E. M. 1983. Diffusion of innovations (3rd ed.). New York: Free Press
- Sachs, J. 2003. The Activist Teaching Profession. Buckingham: Open University Press.
- Schon, D. 1987. How Professionals think in Action. New York: Basic Books.
- Stenhouse, L. 1975. An Introduction to Curriculum Research and Development. London: Heinemann Educational Books. See also The UK Tradition of Teacher Research
- Stuttaford, M. 2004 Possibilities for and of emancipator research: social aspects of ethnicity and health research and service provision Presentation at the University of Warwick 16th June 2004 Available at http://www2.warwick.ac.uk/fac/cross_fac/healthatwarwick/past_events/ethnicity_and_health/_stuttaford.pdf
- UK DCSF 2006.2020 Vision: Report of the Teaching and Learning in 2020 Review Group chaired by Christine Gilbert, Chief HMI. London: DCSF.

UNESCO 2010a. Qualifying and training teachers in Brazil

<http://www.unesco.org/en/brasil/education/other-education-themes/teacher-education-and-training/>

UNESCO 2010b. The Teacher Training Initiative for Sub-Saharan Africa (TTISSA)

<http://www.unesco.org/en/teacher-education/>

US Department of Education Institute of Educational Sciences 2011. What Works Clearing House

<http://ies.ed.gov/ncee/wwc/>

U.S. Department of Education 2006. The Secretary's Fifth Annual Report on Teacher Quality: A Highly Qualified Teacher in Every Classroom. Washington DC: U.S. Department of Education

<http://www.ed.gov/about/reports/annual/teachprep/index.html>

<http://www.ed.gov/teachers/nclbguide/improve-quality.html>

Wenger, E. 1998. Communities of Practice: Learning, Meaning and Identity Cambridge: Cambridge University Press.

Wenger, E., McDermott, R. and Snyder, W. 2002. Cultivating communities of practice: a guide to managing knowledge. Cambridge, Mass: Harvard Business School Press.

Wragg, E. C. 1994. An introduction to classroom observation. London: Routledge.

Zeichner, K. 2008. Keynote: The Third Space: where teachers and academics meet. British Education Research Association (BERA) Annual Conference, Edinburgh, BERA. www.bera.ac.uk/blog/2008/10/professor-ken-zeichner