

BRIDGING THE GAP BETWEEN RESEARCH, POLICY AND PRACTICE
The importance of intermediaries (knowledge brokers) in producing research impact

Wednesday 7th December 2011
Royal Institute of British Architects (RIBA)

SESSION DESCRIPTIONS



genomics forum



Session 1A: News services & journalism

Presentation: *Science for Environment Policy and the SCOOP project: Connecting researchers and policymakers across the EU*

- **Ms Michelle Kilfoyle, Deputy Editor, Science for Environment Policy (SfEP), Science Communication Unit, University of the West of England (UWE)**
- **Ms Karen Desborough, SCOOP Project Manager, Science Communication Unit, UWE**
- Dr Karen Bultitude, Senior Lecturer & SCOOP Training Manager, Science Communication Unit, UWE (co-author)
- Dr Emma Weitkamp, Senior Lecturer & Managing Editor of SfEP, Science Communication Unit, UWE (co-author)

Modern and effective policy needs to be underpinned by evidence from research; yet communicating the outcomes of research projects to policymakers is not easy. The Science Communication Unit at the University of the West of England (UWE) produces two news services, which seek to bridge the gap between researchers and policymakers, to support evidence-based policymaking:

- ***Science for Environment Policy (SfEP)*** – presenting accessible summaries of EU policy-relevant environmental studies (from both social and natural sciences) in a weekly email delivered to over 13,000 subscribers.
- ***Socio-economic and Humanities Research for Policy*** – summarising policy-relevant findings from EU-funded socio-economic sciences and humanities research (SSH), in a monthly email disseminated to over 10,000 subscribers. This is one key element of the SCOOP project.

In addition, the SCOOP project has designed and implemented a series of communication masterclasses aimed at maximising the dissemination and transfer of knowledge from SSH researchers to policymakers. These short courses provide an overview of evidence-based policymaking, including an opportunity to review previous examples of policy-focused materials to identify good practice.

This session will explore the key features of SfEP and the SCOOP project and share the lessons learnt to date that may be of interest to other knowledge brokers. The content will draw on extensive pre-research which has been conducted on policymakers' needs, as well as direct feedback from Masterclass participants and news alert subscribers, and academics whose research has featured in the news services.

Presentation: *The knowledge wheel concept: Ad-hoc coalitions between journalists, scientists and communication experts towards policy change in Africa and the Middle East*

- **Dr Jan Lublinski, Evaluation and Research Consultant, SJCOOP Mentoring Programme for Science Journalists in Africa and the Middle East, World Federation of Science Journalists**
- **Olfa Labassi, Programme Manager, World Federation of Science Journalists**

Specialised journalists covering science, health and environment in developing countries can contribute to policy change. Through their critical reports they build public agendas and force government officials to act. For this to happen the journalists need partners in science and communication for ad-hoc coalitions on specific issues. In this paper we document several cases of major health and environmental problems which journalists have picked up: the shortage of condoms in northern Kenya, the severe suffering of a community in Uganda from Malaria and the campaign of Egyptian journalists against a chemical factory. These journalists are participating in the "SjCOOP"-project, a support programme for science journalists in Africa and the Middle East funded by the Department for International Development (DFID).

Our analysis shows that for successful agenda building several factors come into play: journalistic capacity, a supportive newsroom environment, professional networks, pre-established contacts with experts in NGOs and research institutions, as well as ad hoc coalitions for especially important topics. In this paper we describe journalists and their partners in science and communication as different types of "knowledge brokers". Although their interests are sometimes conflicting, it is in these special cases that they find common ground. Together they then form a "knowledge wheel" and contribute to change. On top of this we describe yet another type of "knowledge broker" which can participate in turning this wheel: the role of the social scientist and evaluator closely following these processes and her/his interaction with policy makers is discussed.

Session 1B: Knowledge relationships & transformation

Presentation: *Knowledge Relationships*

- **Ms Mariza Dima, Knowledge Exchange Associate, Moving Targets Project, School of Arts, Culture and Environment, University of Edinburgh**
- **Angela Fernandez-Orviz, Knowledge Exchange Associate, Moving Targets Project, Edinburgh College of Art**
- **Nicola Searle, Senior Knowledge Exchange Associate, Moving Targets Project, University of Abertay, Dundee**

Presented in the context of Moving Targets, a 3-year project funded by the Scottish Funding Council, the paper draws on the challenges of building and sustaining industry involvement in industry-led knowledge exchange projects from conception and through the first phase of project implementation. Moving Targets, launched in October 2010, is a digital media knowledge exchange project between the Universities of Abertay and Edinburgh and Edinburgh College of Art. The project engages digital media industries and public sector agencies across Scotland's creative and cultural sector. The project coincides with significant economic turmoil in Scotland's digital media sector, with the closure of firms, public funding cuts, agency reorganisation and constantly changing models in media production and audience engagement apparent.

The paper seeks to analyse the different expectations between the open approach of knowledge brokers and the clear objectives often required by industry. These differences manifest themselves in the reception of knowledge brokers by small firms and the public-funded agencies. While agencies embrace collaboration, firms raise concerns about the roles of knowledge brokers and the resources the firm is required to provide. For the project to succeed knowledge brokers must find a balance between these expectations, which requires a deep understanding of the industry and thorough risk evaluation.

The paper reports on the findings of a survey conducted with the Scottish computer games industry. The survey suggests that industry's goals in industry-university projects are primarily concerned with recruiting graduates or identifying new business opportunities. This paper attempts to open up a dialogue seeking solutions for the aforementioned issues based on the authors' experience working as Knowledge Brokers during the past year.

Presentation: *The challenge of transformation: lessons for knowledge brokers from an ethnography of professional practice*

- **Professor John Gabbay, Emeritus Professor, Wessex Institute for Health Research and Development, University of Southampton**
- **Professor Andrée le May, Faculty of Health Sciences, University of Southampton**

Knowledge brokering usually connotes an intermediary who spans the boundaries between researchers and practitioners, trying to persuade them to take more notice of each other with the aim of transferring research findings into practice. However, in our recent book based on an ethnography of primary healthcare (*Practice-based Evidence for Healthcare*, 2010) we suggest that (a) knowledge is not merely transferred but is collectively transformed by practitioners themselves into what we have called "knowledge-in-practice-in-context"; (b) this involves complex social processes, often within communities of practice; (c) "contextually adroit" practitioners use knowledge-in-practice-in-context to meet practical needs that go far beyond just the technical (e.g. clinical). They must encompass the many other competing demands and constraints that stem from their multiple roles, (e.g. managerial, financial, political) and therefore their knowledge-in-practice-in-context must be flexible and multifaceted, relying not (as many knowledge brokers would expect) simply on clear-cut, research-based guidance but instead on what we have termed "mindlines", internalised, malleable, tacit guidelines, which over a lifetime are continually developing and collectively reinforced.

For knowledge brokers this has several implications: firstly, it behoves them to understand the nature of knowledge-in-practice-in-context and the "social life of knowledge" through which research findings are transformed and made fit for practice. Secondly, knowledge brokers need to understand how to infiltrate and work with existing communities of practice and their multiple knowledge sources. Thirdly, new knowledge once transformed may be barely recognisable, rendering evaluation of knowledge brokerage extremely difficult. Fourthly knowledge brokers need social scientists to research those processes more fully.

Session 1C: Think tanks

Presentation: *Innovation and the knowledge economy: the impact of think tanks as knowledge intermediaries*

- **Dr Benjamin Reid, Senior Researcher, The Work Foundation**
- Ian Brinkley, Director, The Work Foundation (co-author)

Research-focused think tanks represent key knowledge intermediaries in developed economies. Their role and agenda is often controversial, and has been subject to sharp critique from both academic and political commentators, but few would dispute either their position: a powerful nexus between policymakers, public and private organisations, and universities – or their degree of impact and influence.

From, admittedly, a partial viewpoint, we see such think tanks playing an increasingly important role in fostering and disseminating innovation within the economy. From one perspective, recent policymaking arguably displays a concern for ‘evidence-based’ policy – and often looks to think tanks-based research to understand that evidence. From the academic perspective, the emerging ‘impact’ agenda for valuing research has increasingly led universities to engage directly with think tanks, including purchasing them outright.

In this paper, we reflect critically on the impact of the liminal role think tanks are playing as knowledge intermediaries, drawing on our own direct experiences as part of a university-owned – but independent – think tank, and the emerging literature on the role of think tanks in the knowledge economy. We argue that independent think tanks, able to critique policy and claims of all political stripes, provide a crucial space and centre of expertise for linking university-derived research to impact and innovation in the broader public and private sector economies in the UK.

In doing so, we set the example of think tanks within a broader context, drawing on Work Foundation research on the role of knowledge intermediaries in facilitating innovation in the UK economy.

Presentation: *Think tanks as research mediators*

- **Dr Katherine Smith, Lecturer in Global Public Health, Social Policy – School of Social and Political Science, University of Edinburgh**

In the last two decades, the number of think tanks based in the UK and Brussels has grown significantly. These organisations provide an important source of ideas for policy audiences who do not always have the resources to collate and review extensive research evidence. As such, think tanks have been framed as useful mediators between research and policy, which academics seeking to influence policy might do well to emulate. On the other hand, concerns have been raised about the ideological lens through which some think tanks frame research evidence. Yet, to date, there has been very little empirical work to explore how think tanks in the UK and Brussels work to influence policy, how they frame research and on whose behalf they operate. This paper begins to address this gap through an analysis of interviews and publicly available textual data concerning think tanks based in the UK and Brussels. It highlights first, how academics have struggled to interest think tanks in key policy issues (such as health inequalities) and, second, how corporations may employ think tanks to lend credibility to particular arguments and campaigns. Both of these examples indicate that there are some important limits on the extent to which academics and policymakers ought to rely on think tanks to perform a ‘research broker’ role. The paper concludes by outlining how an improved understanding of think tank activities might be used to strengthen the relationship between research and policy in the UK.

Session 1D: A knowledge translation strategy

Workshop: *Knowledge Brokering in Public Health: A Promising Knowledge Translation Strategy*

– **Dr Maureen Dobbins, Associate Professor, School of Nursing, McMaster University**

The purpose of this workshop is to provide training in knowledge brokering from first-hand experience. Evidence-informed decision making is necessary for the provision of effective health care services. Through one-to-one interaction with health departments we have determined that we must target knowledge translation strategies at the whole organization and individuals simultaneously.

This interactive workshop is comprised of didactic large group presentations with participant involvement in discussion encouraged, as well as small group work in which participants will reflect on and discuss the knowledge broker role as it is evolving in public health settings in Canada, and consider if and how this role is applicable in other settings.

The components of our knowledge broker strategy, as currently being implemented in a three year study funded by the Canadian Institutes of Health Research, will be presented. Strategies being implemented by the knowledge broker in each step of the evidence-informed decision making process will be presented and discussed. Key milestones within the process of evidence-informed decision making (i.e. relationship building, organizational and individual assessment, goal setting, developing a plan, working phase, evaluation, and sustainability) will also be identified and strategies for achieving them suggested.

As a result of our interactive work with health departments several tools that assist organizations and individuals to practice in an evidence-informed way have been developed. We will discuss these tools and make them available during the workshop. Finally, strategies for evaluating knowledge brokering will be identified and discussed.

Session 1F: Skills and challenges

Presentation: *What makes a good knowledge broker? Reflections on qualities and skills*

- **Ms Sarah Morton, Co-Director (Communication and Knowledge Exchange), Centre for Research on Families and Relationships**
- **Dr David Phipps, York University, Canada**

It is acknowledged that the work of 'boundary spanners' or knowledge brokers in increasing the uptake of research is important {Nutley 2007}, and that relationships are at the heart of much knowledge exchange activity {Best 2010}. Less is known about what kind of qualities and skills are useful to the role of knowledge broker, and how these might be developed.

Building on a combined seventeen years experience of carrying out knowledge brokering, employing and supervising knowledge brokers on a variety of projects, David Phipps (York University, Canada) and Sarah Morton (Centre for Research on Families and Relationships, Scottish university consortium, UK) reflect on the skill set that helps knowledge brokers achieve collaboration and partnership for increased research utilisation, drawing on the knowledge of their respective teams of knowledge brokerage staff. David has supervised 3 full time brokers, 2 full time project coordinators with brokering roles and supervised a total of 6 graduate students who have worked in the KMb Unit. Sarah has been a broker for ten years, and has supervised 3 full-time and 1 part-time broker, a project coordinator with a KMb role, and acted as an advisor/mentor for two brokers for national research projects. Their reflections draw on Canadian and Scottish contexts and examples.

They consider some of the personal qualities which have made knowledge brokering a success, and reflect on some of the learning from when things have not progressed. They review the skill sets they require for knowledge broker roles and assess the idea that personal relationship management qualities are as important as specific skill-sets. The session will also present and reflect on training and development opportunities for staff in KB roles.

Presentation: *Bridging the gap or just making a splash? Why funders need to recognise that generating impact beyond academia is as intellectually challenging as research*

- **Dr Simon Pardoe, Director, PublicSpace Ltd**

The demand for researchers to produce impact beyond academic debate is now a key challenge across the disciplines. The UK Research Councils offer guidance, yet there is a familiar contradiction. Despite the Research Councils' Mission to 'build partnerships and enhance take-up and impact', and the ESRC call for 'opening a dialogue between researchers and research users', the Mission reduces the issue to 'the behaviour and attitudes' of 'those who receive funding', and the new ESRC guidance offers simplistic advice to produce 'clear, succinct messages' (June 2011). In this way, these key documents fail to acknowledge the intellectual and institutional challenges involved in generating wider impact and in 'bridging the gap'. Ironically, the ESRC guidance also fails explicitly to utilise social science research on communication, diffusion of innovation, research dissemination and knowledge transfer / exchange / utilisation. So is this about bridging the gap or just making a splash?

In practice, researchers, participants and potential users have different knowledge and assumptions; their institutions and professions are engaged in debates with different concerns and priorities. So one challenge is to find out, in collaboration with practitioners, the relevance and significance of research across institutional boundaries. Another is to distil, reframe, translate and mobilise relevant insight, with some critical awareness of the pitfalls.

My work with researchers across disciplines to communicate their research (e.g. educational literacies, river basin management, and computer models in toxicology) was prompted by my training and research in Applied Linguistics and Science Studies. Using a current project as an example, in this presentation I will analyse some of the practical and intellectual challenges, as part of developing a more useful framework to generate impact beyond academic debate.

Session 1G: Knowledge broker roles

Presentation: “I am a knowledge broker”: Exploring the enactment of formalised knowledge brokering roles in academic/practice partnership

– **Ms Sarah Chew, PhD Student, Health Sciences, University of Leicester**

Knowledge brokering is a concept which lacks a consistent terminology and definition. Furthermore, the human element of knowledge brokering is under-researched; little is known about enacting formalised knowledge brokering roles in practice. This study explores how theoretical understandings of knowledge brokering relate to its enactment in practice and, in addition, furthers knowledge of individuals’ experiences of inhabiting formalised knowledge brokering posts.

The paper draws on a case study of seven posts in an academic/practice partnership in the English healthcare system created to fulfil a knowledge brokering role. To generate insights into their experiences at the ‘coal face’ of knowledge brokering, the post holders kept reflexive diaries to document the early phases of the roles; in-depth interviews were also conducted.

The posts shared a similar developmental trajectory and several key themes were identified. “Managing competing interpretations” reveals how varied understandings of knowledge brokering were problematic and underpinned an ongoing process of negotiation and re-specification of the remit of the posts between post holders and stakeholders. “Tailoring” relates to how local contexts influenced the enactment of the posts. As post holders established their role identities, “Autonomy” was increasingly cited as a positive aspect of the role.

The findings highlighted how terminological and conceptual inconsistencies at the theoretical level led to difficulties when instituting and enacting the formalised knowledge brokering roles in practice. This paper will discuss these findings in relation to the current knowledge brokering literature.

Presentation: Social science knowledge brokers in higher education: Who are they and what do they do?

– **Dr Claire Lightowler, Project Manager: Evidence Informed Practice, Institute for Research and Innovation in Social Services (IRISS)**

– **Dr Christine Knight, Policy Research Fellow, ESRC Genomics Policy & Research Forum, University of Edinburgh**

Knowledge brokers based within higher education institutions (HEIs) are those who bridge the worlds of research and policy, practice, or business. Within the social sciences there has been a growth in those employed with a specific knowledge brokerage remit in UK HEIs, driven in part by the increased importance placed on the “impact” of academic research. However, little is known about this emerging group of professionals.

Based on qualitative research with knowledge brokers at the University of Edinburgh (College of Humanities and Social Science), this paper begins to explore issues relating to who knowledge brokers are and what they do. The paper looks at the background of knowledge brokers, exploring their career pathways and experiences to date. It specifically examines the hybrid nature of their career paths, which tend to include a range of experience in different sectors and fields. We also explore what knowledge brokers do, examining the activities undertaken by knowledge brokers and the amount of time spent on different tasks. Finally the paper explores the future for these knowledge brokers, looking at career aspirations and plans for the future.

Although these issues were investigated through interviews with a small group of knowledge brokers within one university, we suggest that experiences reported by this group may be representative of issues facing knowledge brokers in HEIs across the UK, and possibly further afield.

Session 2A: Impact & evaluation

Presentation: *Knowledge brokers' influence on policy and practice effects of public engagements*

- **Dr Michael M. Burgess, Professor and Principal, Centre for Applied Ethics and Department of Medical Genetics, College of Interdisciplinary Studies, University of British Columbia**
- Kieran O'Doherty, Assistant Professor, University of Guelph (co-author)
- Barbara Koenig, Professor, Mayo Clinic (co-author)
- Peter O'Leary, Hugh Dawkins and Caron Molster, Office of Population Health Genomics, Health Department of Western Australia (co-author)
- Peter Watson, Professor, Department of Pathology, BC Cancer Agency and the University of British Columbia (co-author)
- Sheila O'Donoghue, Project Manager, British Columbia BioLibrary (co-author)

Demonstrating the effects of public engagement on policy and practice is a significant challenge. Direct causal links between on policy or practice are difficult to demonstrate, even when the emerging policies and related literature reflect the conclusions of deliberations. Considering the role of “knowledge brokers” provides a means of illustrating a range of influence.

Using the same approach to deliberative public engagement in three countries, we can demonstrate three different kinds of influence on policy or practice through different intermediaries. In Canada, the involvement of researchers and administrators with responsibility for managing biobanks enabled influence on practices and governance. In Western Australia, the hosting of the events by the Office of Population Health Genomics (Health Department of Western Australia) led to the incorporation of deliberations into research policy. In the US (Mayo Clinic, Rochester Minnesota), the participation by administrators with responsibility for a biobank supported the involvement of participants in the public deliberation becoming members of the governing board.

These routes of knowledge mobilisation and involvement of a range of intermediaries suggest a rich context of governance in which public deliberations influences policy and practice through altered practices, governance structures, policies and direct participation on governing boards. Further, these experiences demonstrate considerable advantage to involving “knowledge brokers” in the events rather than depending on static delivery of results to policy audiences.

Presentation: *The invisible made visible: using impact evaluations to illuminate and inform the role of knowledge intermediaries*

- **Dr Laura Meagher, Senior Partner, Technology Development Group**
- Dr Catherine Lyall, Deputy Director, Innogen, University of Edinburgh (co-author)

Investments in research are made by funders in the UK and other countries in the hope that both academic excellence and non-academic impacts will result. While identification of research impacts is currently the focus of numerous exhortations and assessments, we take the view that it is also important to dig deeper into understanding how impacts actually arise. Challenges of generating impacts are many, including the elusive subtlety of many knowledge exchange processes which require attitudinal and behavioural changes at multiple levels. We use rigorous evaluations of non-academic impacts of publicly-funded research to capture not only impacts but also insights into the processes and good practice that can lead to them. We have found that appropriately sensitive evaluation of impact generation can tap into the reservoir of ‘tacit knowledge’ growing among participants in knowledge exchange. This paper offers a meta-evaluation or synthesis of our learning from across diverse evaluations of innovative UK funding schemes, including but not limited to: the Scottish Higher Education Funding Council’s Research Development Grant Scheme, ESRC Psychology response-mode grants, and the ESRC/EPSRC/DTI scheme, People at the Centre of Computers and Information Technology. Findings highlight the importance of interactive processes and the critical role of knowledge intermediaries. Lessons learned were gathered which can inform those playing knowledge intermediary roles. While knowledge intermediaries take diverse forms, and often act alone, learning from evaluation can advance recognition of their role, and enable reflection on lessons learned, in order to enhance the interactive relationships connecting research, policymaking and practice.

Session 2B: Active intermediaries / NHS Research Networks

Presentation: *The Role of Active Intermediaries in Knowledge Exchange: Lessons from Urban Research*

- **Professor Tim May, Director, Centre for Sustainable Urban and Regional Futures (SURF), University of Salford**
- **Dr Beth Perry, Research Fellow, SURF**

Dominant ways of constructing the role of knowledge in society produce a missing middle in which the significance of exchange activity is diminished or impeded. Active translation is needed that enables research to resonate with experiences and issues in order that they are intelligible. There is so much to celebrate about how communities share and develop their knowledge, including within social research communities, but this is easily denigrated in the name of particular constructs of knowledge production and reception. The power of attributed value to particular forms of knowledge enables this to continue. A continuous and interactive relationship between research participants and users is required, in which differences are recognized, negotiated, tolerated and acted upon for mutual benefit according to changes in the environments we occupy. In this paper we reflect upon these issues from experiences within a Centre (Centre for Sustainable urban and Regional Futures. Please see: www.surf.salford.ac.uk) that operates on a mixed economy of research funding but also seeks to be a space of communication that informs policy developments. *Active Intermediaries for Effective Knowledge Exchange: Populating the 'Missing Middle'* – <http://bit.ly/rzQjvh>

Presentation: *Delivering better health services: brokering knowledge exchange between the NHS and HSR communities*

- **Mr Tom Barker, Service Delivery and Organisation (SDO) Network Manager, NHS Confederation**
- **Jill Fairbank, Collaboration for Leadership in Applied Health Research and Care (CLAHRC) Support Programme Manager, NHS Confederation**

The NHS Confederation's Research Networks support and broker knowledge exchange between NHS organisations interested in engaging with and using health services research to develop and improve their services, and the health services research (HSR) community. The Networks work to mobilise knowledge between the two communities and build research capability and capacity amongst those who manage, organise and deliver health services, whilst promoting the value and importance of HSR in policymaking and management, and in turn working to ensure that HSR priorities reflect the needs of the public, policymakers and managers.

The presentation will highlight the different strategies and techniques used by the Research Networks in meeting these aims. Activities are shaped to meet the needs of the different strata of NHS management: from senior leader through to middle and new managers, and at different geographical levels, from the national level through to regional and local settings. The Research Networks collaborate and work in partnership with health services research centres, NHS organisation, and NHS innovation infrastructure, including the NIHR Collaboration for Leadership in Applied Health Research and Care (CLAHRC).

Set against the challenging reality of the NHS attempting to balance the discipline of shorter-term quality, innovation, productivity and prevention agenda with the creativity of longer-term system reform, the presentation will also consider emerging learning from the Research Networks on how best to engage, mobilise and connect the different communities.

Session 2C: Contexts and systems

Workshop: The role of contexts in knowledge brokering systems

- **Dr Sue Oreszczyn; Research Fellow; Design, Development, Environment and Materials; The Open University**
- **Professor Andy Lane, Professor of Environmental Systems, Department of Systems and Communications, The Open University**

The aim of this session is to produce richer models of knowledge brokering systems and address the question 'How context dependent are models for brokering?' – For example, is brokering in agriculture the same as in pharmaceuticals?

This session will capture and map out the thinking of participants on the key components of knowledge brokering systems. It will identify which people and what types of knowledge are involved in brokering and the nature of the exchange between those involved. The session will draw on our experiences of knowledge exchange processes when working with policymakers, businesses and NGOs across a number of participatory research projects.

Participants will be provided with the basic components of a map that, at first individually and then collectively, they can use to produce models of brokering systems from their experiences for group discussion. The outputs will subsequently be written up in a report for circulation.

Session 2D: Third sector

Panel: *The Three bridges to the Third Sector*

- **Mrs Razia Shariff, Head of Knowledge Exchange, Third Sector Research Centre (TSRC)**
- **Dr Karl Wilding, Head of Policy Research and Foresight, National Council for Voluntary Organisations, and Practice Fellow of TSRC**
- **Prof Alex Murdock, Head of Centre for Government and Charity Management, London South Bank University, and Research fellow of TSRC**

This panel session will focus on the different ways in which to bridge the gap between academia and the third sector. The third sector includes civil society, social enterprises, community groups and other not-for-profit organisations. Presentations will be made by the Third Sector Research Centre, the National Council for Voluntary Organisations, and London South Bank University. They will share their expert knowledge on the different pathways to achieving impact.

- The Third Sector Research Centre (TSRC) was established in 2008 as a national ESRC research centre co-sponsored by the Office for Civil Society and the Barrow Cadbury Trust; and hosted by the University of Birmingham and University of Southampton. TSRC has a dedicated Knowledge Exchange Team (KET) who have developed and are implementing, their Knowledge Exchange, Communication and Impact Strategy. KET have developed a matrix to plot different knowledge exchange activities based on their work to date.
- The National Council for Voluntary Organisations (NCVO) is the leading umbrella body for the sector and has a dedicated, Research, Policy and Foresight Team who annually produce the highly regarded Civil Society Almanac presenting the facts and figures on the size, character and scope of the third sector as well as commenting on government policy as a key strategic partner of the Office for Civil Society.
- The Centre for Government and Charity Management, London South Bank University (LSBU), co-hosts the annual International Social Innovation Research Conference and is delivering Knowledge Transfer Partnerships, CASE studentships, Vouchers and Placements as part of the ESRC/TSRC's Social Enterprise Capacity Building Cluster.

TSRC Presentation – Razia Shariff. TSRC has developed a model that offers a step change in the way academic institutions integrate knowledge exchange as part of the research process. TSRC's approach is based on current definitions, theories and models of knowledge transfer. TSRC's presentation will include some of the initial reflections on the approach used by the Centre to engage with, and involve non-academic stakeholders in knowledge exchange. TSRC's KET have adapted Arnstein's 'Ladder of participation', the Knowledge Exchange Impact Matrix (KEIM), to plot the different types of knowledge exchange activities based on the extent of meaningful knowledge exchange and the number of stakeholders engaged. The matrix works on the assumption that effective knowledge exchange occurs when bringing different stakeholders together in a participatory space over a period of time. Research knowledge is shared and interaction occurs which informs the development of research, and clarifies inconsistencies between the reality of the stakeholder and the research. Using this matrix approach means that TSRC does not equate high numbers of citations or media coverage as key indicators of successful knowledge exchange but instead highlights the quality of the knowledge exchange by how meaningful the interaction has been and its effect on future research, policy and practice.

NCVO Presentation – Dr Karl Wilding. Should policy makers and practitioners engage with academic researchers? This question – and its more negative variants – is a question sometimes asked in organisations whose primary purpose is social change. The reply of many (based upon experience) is 'no'. How can knowledge brokers – whether in a formal or informal role – change such perceptions in order to draw out the shared value which emerges from collaboration? In a personal account from NCVO's Head of Policy, Research and Foresight – an active knowledge broker – this presentation highlights the challenges, frustrations, opportunities and successes of developing a network mindset in a public policy organisation.

LSBU Presentation – Prof Alex Murdock. LSBU, as part of ESRC/TSRC's Social Enterprise Capacity Building Cluster, has been involved in a number of projects using Knowledge Transfer Partnerships, Placements and Vouchers. These have enabled the University to operate in an intermediary fashion to help third sector organisations respond to the challenges of social enterprise and innovation. This presentation will compare and contrast the range of such initiatives. It will also draw on recent international consultancy work with Emmaus International and work examining the operation of social enterprise with native Alaskan communities. There is potential to learn from international experience as well as from the lessons drawn from the UK setting.

Session 2E: Finding your market

Workshop: *Finding your market*

- **Mr William Solesbury, Senior Visiting Research Fellow, Political Economy, Kings College London**

Knowledge brokers intermediate between the producers and consumers of research. So they need to develop a sophisticated understanding of research consumption. To help them this workshop will explore how policy makers and practitioners (including policy makers in this term) discover, understand and apply research to their work. It will focus on such matters as:

- Identifying the fields of practice to which social science is relevant
- How practitioners in those fields value academic research against other kinds of relevant evidence (like personal experience, professional norms, media coverage)
- The various ways in which research can help practice – such as increasing understanding of reality, reshaping attitudes, devising products and processes, evaluating outcomes
- The relationships that academic researchers may have with practitioners – as sources, advisers, collaborators, contractors
- The importance of recognising current arguments and opportunities in maximising research impact
- The qualities that make research useful to practitioners

The workshop will offer knowledge brokers some concepts, tools and techniques for finding the market for research. These should also provide an agenda for participants' exchanges of experience.

William Solesbury works as a researcher, consultant and trainer on the uses of evidence in policy and practice.

Session 2F: Regional higher education networks

Panel: *ESRC Knowledge Exchange Regional Higher Education Networks*

- **Dr Siobhán Jordan, Director, Interface**
- **Oliver Moss, Research Fellow/Research Development Manager, School of Arts and Social Sciences, Northumbria University**

Since 2003 there have been a series of Government reports both raising the profile of knowledge transfer and emphasising the importance of strengthening links between academia and business, public and third sectors. In 2005 the former Office of Science and Technology made available funding for both the Research Councils and Regional Development Agencies (RDAs) to increase the rate of knowledge transfer, collaborative partnerships and to ensure that the knowledge/research generated from Research Council funding is utilised and exploited to benefit the regions as well as the UK as a whole.

To raise awareness and promote the ESRC's knowledge exchange and transfer mechanisms/opportunities within higher education institutions (HEIs), the ESRC Knowledge Transfer Team organised a series of regional awareness seminars in 2008. The primary audience for these seminars was all HEI Business Development, Knowledge Transfer Managers, Pro Vice Chancellors and Social Science Faculty Managers, and those actively engaged with knowledge exchange activities. As one outcome of the seminars, delegates were offered the opportunity to apply for funding to develop and maintain the HEI Knowledge Transfer Regional Forum/Network within their region.

Six networks were funded: East of England, North West, South West, Scotland, North East and Wales. The purpose of the regional networks is to:

- coordinate regional events
- circulate regular up-dates
- promote ESRC Knowledge Transfer schemes and funding opportunities
- liaison with the ESRC, RDA, Devolved Administration and/or existing regional networks
- share examples of best practice and social science impacts

This session will comprise short talks by the leaders of 2 of the regional networks (Scotland and North East England), followed by the opportunity for group discussion. Talks will summarise who each network has involved, its activities and their rationale, enabling a discussion on mechanisms to provide support, networking and development opportunities for knowledge exchange staff in HEIs and elsewhere.

Session 2G: Knowledge markets / Policy & practice

Presentation: *Knowledge Brokers, Entrepreneurs and Markets*

– **Mr Chris Caswill, Visiting Professor, Politics, University of Exeter**

This paper will argue that movements of knowledge between producers and users should not be analytically separated from the contexts in which these exchanges occur. Drawing on evidence from an EU funded project on the future of social sciences and humanities, this paper will discuss a variety of knowledge intermediary roles, with particular reference to the UK, but also located in a comparative European context. It will suggest that 'knowledge broker' is too limited a concept, as it implies a passive, technical and implicitly linear transfer of knowledge from the producer sphere to a willing and politically neutral set of knowledge consumers. Evidence from interviews with a wide range of UK knowledge intermediaries, and comparison with other European responses, points to activity within a complex set of knowledge markets, in which the intermediaries are themselves political actors – and for whom the label of 'knowledge entrepreneur' (borrowing from Mintrom's (1997) concept of the 'policy entrepreneur) seems more appropriate.

Mintrom, M. (1997) "Policy Entrepreneurs and the Diffusion of Innovation", American Journal of Political Science, Vol. 41, No.3, July, pp. 738-770.

Presentation: *'Capturing the Learning' around designing, implementing and evaluating evidence informed approaches to improving outcomes for children, families and communities in Ireland*

– **Dr Helga Sneddon, Senior Fellow, Research & Evidence, Centre for Effective Services**

– Michelle Harris, Stella Owens and Kathy Brennan, Centre for Effective Services (co-author)

Under a new initiative, organisations have been developing and delivering services based on evidence of what works to promote prevention and early intervention for children and youth throughout Ireland (NI and ROI). These services work in a wide range of areas including early childhood, sexual health, literacy, social and emotional learning, crime and violence prevention, youth mentoring and parenting support.

As part of this initiative (funded by Atlantic Philanthropies, government and others), 18 services have been independently evaluated using qualitative and quantitative methodologies. Studies have explored process and implementation issues, and measured outcomes using approaches such as randomised control trials. During the next three years, the services and research teams will individually publish results from their evaluations.

There is exciting potential for the findings to be pulled together to provide a strong evidence-base to inform future early intervention and prevention policy and practice for children and young people. This presentation will describe the 'Capturing the Learning' project which aims to synthesise this collective, overarching learning from the initiative as a whole. In addition to what the initiative tells us about influencing outcomes in a range of areas, an important area for 'Capturing the Learning' will be to explore the tacit learning held by the service providers about the barriers and enablers they have experienced when undertaking evidence-informed service design and implementation. The project is currently ongoing so we will also describe planned strategies for presenting and using the collective learning as it emerges so that maximum impact can be achieved.

Session 3A: Beacons for Public Engagement

Roundtable: *Strategies on knowledge brokerage: Insights from the Beacons for Public Engagement*

- **Heather Rea, Edinburgh Beltane**
- **Bruce Etherington, Beacon for Wales**
- **Erinma Ochu, Manchester Beacon**
- **Steve Cross, UCL Beacon**
- **Kate Hudson, Beacon North East**
- **Julie Worrall, CUE East, University of East Anglia**

The six Beacons for Public Engagement are university-based collaborative centres that are working to support, recognise, reward and build capacity for public engagement. The beacons are at the forefront of efforts to change the culture in universities, assisting staff and students to engage with the public. Their partners include further education colleges, museums, galleries, businesses, charities, community groups and third sector organisations, TV and press, and public bodies.

This session will explore how the Beacons for Public Engagement act as knowledge brokers in their communities and what they have learned from this experience.

- Edinburgh Beltane brings together expertise from 5 Higher Education Institutions in Edinburgh and the University of Highlands and Islands (UHI), with 11 other public, policy, research and engagement partners.
- The Beacon for Wales is a partnership between Cardiff University, University of Glamorgan, Techniquet, Amgueddfa Cymru-National Museum Wales and BBC Cymru Wales.
- The Manchester Beacon partners are the University of Manchester, Manchester Metropolitan University, University of Salford, Manchester Museum of Science and Industry, and Manchester: Knowledge Capital.
- The partners in UCL's work under the beacon's umbrella are the British Museum, the South Bank Centre, Birkbeck College, Cheltenham Science Festival, Arts Catalyst, and City and Islington College.
- Beacon North East is a partnership between Newcastle University, Durham University and the Centre for Life.
- CUE East is led by the University of East Anglia (UEA).

Session 3B: Research in Practice / Bulletin Academic

Presentation: *Change Projects: a method for knowledge exchange and co-production*

– **Dr Susannah Bowyer, Research and Development Manager, Research in Practice**

Research in Practice and Research in Practice for Adults have over 20 years' combined experience in knowledge exchange and brokering. One of our most successful models is the Change Project method, a cycle of research scoping and review, collaborative knowledge exchange and co-production of resources which are then piloted and disseminated for use across our partnership networks in children's services or adult social care. Using examples from our 15 completed Change Projects, our presentation will draw out key messages about engaging early and facilitating full collaboration between practitioners and researchers in order to produce evidence-informed resources that deliver impact on practice.

Presentation: The Journey towards Impact: A case study of the Prometheus weather files

– **Wendy Fitzsimmons and Chris O'Brien, Communications Consultants, Bulletin Academic**

Bulletin Academic is a specialist communications consultancy. Our experience of acting as knowledge brokers for universities underlines our conviction that working towards impact can not only help satisfy the requirements of the REF but deliver benefits in its own right. From a communications perspective, the process of achieving impact is perhaps more aptly described as a *journey*; this comes closer to conveying the many obstacles and dead ends that lie along the way – and the unfortunate reality that it can take an exceptionally long time.

These benefits and obstacles are best illustrated through an example of our work on the University of Exeter's PROMETHEUS project- a set of weather files that predict weather up to 2080 and can be used to test the resilience of any building design to climate change. Using EPSRC 'Pathways to Impact' funding, Exeter employed us to take the project as far down the road to impact as possible within a limited timeframe. Impact, in this case, was defined as ensuring PROMETHEUS became the standard climate change weather files for the building industry.

By working through this example we will illustrate the process we undertook in collaboration with Exeter including the initial planning, the main activities, the follow up and the results to date. We will also cover what we think the research could still achieve in the future, the skill sets utilised during the impact process and how, from our perspective, universities could improve their own internal processes to work towards an integrated impact strategy.

Session 3C: Web 2.0

Panel: What's the point of Web 2.0 tools for knowledge brokers?

- **Amanda Cooper, Ontario Institute for the Study of Education, University of Toronto, Canada**
- **David Phipps, York University, ResearchImpact-RéseauImpactRecherche, Canada**
- **Sarah Morton, Centre for Research on Families and Relationships, Scotland (Discussant)**

Knowledge brokering is about relationships. The literature cites issues of trust, transparency, power and time as factors that contribute to effective relationships between researchers and decision makers. But what about the role of technology? Social media tools such as Facebook and twitter started out as tools to support relationships between friends but have now become important tools for companies to connect to customers. Non profits use social media to connect to donors, faith leaders to followers, politicians to voters.

How about you? How do you use on line tools to support your knowledge broker practice? This panel will present two perspectives on web tools and knowledge brokering. Amanda Cooper will present empirical data of the online strategies being utilized by 44 Canadian research brokering organizations in education. David Phipps will present a practitioner's perspective on social media and how he uses social media tools in his knowledge brokering practice. Sarah Morton will then serve as a discussant and will facilitate group discussion from the perspective of a knowledge broker who is taking a serious look before leaping into the web 2.0 world.

Presentation 1: Knowledge mobilization in an on line world

- **David Phipps, York University, ResearchImpact-RéseauImpactRecherche (presenter)**
- Krista Jensen, York University, ResearchImpact-RéseauImpactRecherche (co-author)
- Gary Myers, KMbeing.com (co-author)

York University (Toronto, Canada) developed the first Knowledge Mobilization (KMb) Unit in Canada that is fully integrated into the university's research infrastructure. The KMb Unit is a service unit supporting the multi-directional relationships between university researchers and decision makers in community and/or government organizations. We employ methods of producer push, user pull, knowledge exchange and co-production in order to maximize the non-academic impact of York's research. We also use social media.

Blogs. Twitter. Flickr. Delicious. YouTube. Linked In. Knowledge brokers at York's KMb Unit have tried all of these (but not Facebook) in our practice working from the theory that if you can start a personal relationship on line you can start a research relationship on line. At least that's the theory. Not all of these have worked well. Some have had great results.

This session will be a practice based session providing reflections of a KMb practitioner experienced using social media. It will present an overview of different social media tools and how we have used them to support our practice. We've got lots of numbers including hits, followers, retweets, comments, social bookmarks and we track our scores regularly on klout and twittergrader; however, the numbers do not tell the whole story. This presentation will use story telling and case studies to illustrate the positive effects of twitter and dig a little deeper into our understanding of the ResearchImpact tweets.

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Presentation 2: Social media and all that jazz- Online Strategies used by Canadian Knowledge Brokers in Education
– **Amanda Cooper, Ontario Institute for the Study of Education, University of Toronto, Canada**

Background: I use the term 'knowledge mobilization intermediary' (KMI) to describe third party organizations whose active role between research producers and users is a catalyst for knowledge mobilization (other similar terms include knowledge brokers, mediators, purveyors). Intermediaries are important because practitioners rarely come into contact with primary research directly from academic journals or lengthy research reports. Instead, educators engage with research indirectly through colleagues, professional development, the media, and often through various third party organizations.

Research Question: What knowledge mobilization activities (products, events and networks) are intermediaries involved in, and what online dissemination mechanisms do they use?

Purpose: This paper explores the online strategies used by 44 KMI organizations in education in Canada. It analyzes how websites, RSS feeds, blogs, online forums as well as social media (Twitter, Facebook, YouTube) are being utilized for research dissemination. This paper also reports on frequency of social media activity as well as the nature of posts.

Findings: Most KMIs use very few online strategies in addition to their website. 32 % of Canadian KMIs use no online strategies at all, beyond their website; although, a few utilize 5 or more interactive strategies. Most of the online strategies utilized are one-way communication rather than providing opportunities for two-way communication. 30% of Canadian KMIs are using Twitter and Facebook as knowledge mobilization tools. Overall, the use of social media is not pervasive, although this mechanism holds potential for innovative KM practices.

Discussion: Sarah Morton will then serve as a discussant and will facilitate group discussion from the perspective of a knowledge broker who is taking a serious look before leaping into the web 2.0 world.

Session 3D: Developing countries

Panel: *Knowledge brokering in developing countries*

- **Dr Kirsty Newman, Head of Evidence-Informed Policy Making Programme, International Network for the Availability of Scientific Publications**
- **Catherine Fisher, Impact and Learning Team, Institute of Development Studies**
- **Dr Matthew Harvey, Evidence Broker – Research Uptake team, Research & Evidence Division, Department for International Development (DfID)**

Evidence-informed policy making has become a hot topic in International Development circles. During this session, individuals who are carrying out research and/or capacity building for knowledge brokering in developing countries will share some of the lessons they have learnt. In addition, there will be an opportunity for an interactive discussion to consider how international development professionals can learn from the experience of those working in the knowledge brokering sector in the UK.

We aim to explore a number of key questions including:

- What can be done to support greater evidence-based policy and practice in developing countries?
- Who are the knowledge brokers in these contexts and what are their functions?
- What can be done to support the motivations and abilities of decision makers in developing countries to use research evidence in their work?
- What lessons and innovations are there from the UK that can support the work of people working in development contexts?

Catherine Fisher will share insights drawn both from her work as a knowledge broker within international development contexts and from the IDS convened Knowledge Brokers' Forum, an international and cross sectoral discussion on theory and practice of Knowledge Brokering and its contribution to social change.

Kirsty Newman will discuss INASP's work to build the 'evidence literacy' of policy making staff in Africa. This work aims to enhance the abilities of parliamentary staff, civil servants and policy advisors to access, evaluate and use research information. A key feature of the approach is that the training and capacity building is implemented by in-country experts working closely with policy making institutions.

Session 3E: A practical tool

Workshop: *Understanding knowledge exchange: a practical tool to guide knowledge brokering activities*

- **Dr Vicky Ward, Lecturer, Leeds Institute of Health Sciences, University of Leeds**
- **Dr Simon Smith, Leeds Institute of Health**

Knowledge brokering comes in many shapes and sizes. It can be focused on the dissemination of pre-existing research, the production of new research knowledge or on creating permanent links between researchers and users. There is little guidance which is available to help knowledge brokers understand their roles or plan and organise their activities. This workshop is designed to plug that gap.

We will present a descriptive framework of knowledge exchange which was developed in a healthcare context. The framework identifies five key elements which characterise the knowledge exchange process in the context of interactive problem-solving. It can help knowledge brokers by showing how and where their activities fit into this overall picture.

During the workshop we will provide an opportunity for participants to work through several scenarios, using a series of questions based on the knowledge exchange framework. The workshop will conclude with a period of reflection and discussion about how the framework could help participants in their knowledge brokering roles.

Session 3F: Learning & development

Workshop: *A new way to learn and develop?*

- **Lara Isbel, Training and Development Coordinator, Edinburgh Beltane (Beacon for Public Engagement)**
- **Razia Shariff, Head of Knowledge Exchange, Third Sector Research Centre**
- **Both workshop leaders are members of the Working Group, AURIL-JISC Continuing Professional Development Framework for Business and Community Engagement Practitioners**

This session will introduce a new draft Continuing Professional Development (CPD) framework for Business and Community Engagement (BCE) practitioners, the initial output of a collaboration between AURIL (Association for University Research and Industry Links) and JISC (the UK's expert body on information and digital technologies for education and research).

The AURIL-JISC project is supporting the Continuing Professional Development needs of staff working in further and higher education and related sectors, including the Research Councils, who are involved in Business and Community Engagement (BCE). The project builds on two key developments which have now converged: an earlier JISC project to support training and CPD for BCE, and AURIL's current review of its CPD Framework for Knowledge Transfer.

The project aims to:

- Create a usable and relevant professional development framework for BCE
- Enhance support offered to individual BCE practitioners in their CPD
- Support organisations in the management and development of BCE practitioners

Outputs will be:

- An updated professional framework for Business & Community Engagement based on the AURIL CPD Framework for Knowledge Transfer
- An online self-evaluation and collection of training resources to support individuals to identify their development needs and find appropriate CPD resources, building on the pilot tool created in an earlier project
- A set of resources and case studies to support institutions in their use of the framework and online tools

Delegates in this session will be invited to contribute to the development of the new CPD framework by exploring what BCE involves, KE roles, and the knowledge and skills KE practitioners use.

Session 3H: Do we need brokers?

Panel: *Do we need brokers?*

- Dr Oscar Forero and Dr Paul Oldham, Research Fellows, Cesagen, Lancaster University
- Dr Stuart Hogarth, Research Fellow, Department of Political Economy, King's College London
- Professor Nicholas O'Regan, Bristol Business School, University of West of England

This panel will consider whether specialist intermediaries or brokers are the best mechanism for knowledge exchange in all contexts. Short presentations will be followed by discussion amongst the panel and audience members.

Oscar Forero and Paul Oldham. *Knowledge brokering: Critical perspectives from work on biodiversity and indigenous peoples in South America*

In considering the relationship between impact, communication and brokerage it is important to recognise that some research is deliberately designed with specific impacts and uses by target audiences in mind. In this presentation we draw on experience with the Cesagen digital methods facility to explore experiences with intermediaries and the generation of impact ranging from work with indigenous peoples in Amazonia and the Andes to the presentation of research results at the United Nations Convention on Biological Diversity and the World Intellectual Property Organization (WIPO). We argue that well designed research treats communication, translation, brokerage and anticipated impacts as central elements of research design rather than added extras. In so doing we draw on some of the insights gained in particular forms of practical or applied research. In the effective communication of research results to audiences we argue that it is important to focus on the process of brokering rather than on specific brokers. We suggest that brokerage as a process involves acts of communication and negotiation with particular audiences and anticipating the need for adaptation of research design and presentation in the course of such negotiations. This responsiveness also requires hard-headed assessment of priority areas for impact and of the utility or otherwise of relying on or seeking intermediaries in brokering the communication of research results. In general, with reference to our own research experience we remain to be convinced about the role of specialist intermediaries in brokering research. This presentation will explore and amplify how we came to this assessment.

Stuart Hogarth, *Do we need knowledge brokers? Academics as policy entrepreneurs*

This presentation will describe how my academic work on the regulation of genetic tests has been used to inform public policy in Europe and North America. Using this as a case study I will discuss what is required for academics to be effective policy entrepreneurs, question the need for knowledge brokers and consider the advantages and disadvantages of such activity for academics in the early stages of their careers.

Between 2004 and 2007 I was engaged in a transnational policy analysis of the regulatory issues arising from genetic testing for common diseases. This work received a Leveraging / Collaboration Award from the US Food and Drug Administration (FDA) and resulted in two related policy reports for Health Canada, as well as briefings for the UK Human Genetics Commission (HGC) and the European Commission. The latter would appear to have had significant influence on the future of the IVD Directive, the main regulatory instrument for genetic tests in Europe. I have also participated in the drafting of the OECD's guidelines on quality assurance for molecular genetic testing and was a member of the UK working group convened by the Human Genetics Commission which developed a Common Framework of Principles for direct-to-consumer genetic testing. I am continuing his work in this area as a member of the FP7 EuroGentest network.

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Nicholas O'Regan (co-authors: Tim Hughes and Glenn Parry, UWE), *Routes to effective knowledge exchange: The role of intermediaries*

In-depth interviews were conducted with 69 academics, practitioners and intermediaries to explore academic/practitioner engagement in business. The research identifies a range of different routes through which successful engagement might happen (Hughes et al. 2011). A number of these routes involve intermediaries in “bridging the gap”. The way these intermediaries act, in conjunction with the main routes to engagement, varies across different management disciplines. For example, within the accountancy discipline, where the professional bodies are particularly powerful, these bodies often play a crucial role: setting relevant agendas for teaching and research; commissioning research; allocating funds for research by academics; and in setting up joint research committees. In contrast, in more open disciplines with weaker professional bodies, such as marketing and strategic management, intermediation is less formal and more varied. In this situation knowledge networks around particular interest groups can provide an effective way for two-way knowledge exchange. The other major intermediary route to engagement is commercial consultancy. Consultants can be seen to provide a valuable search, filtering and interpretation role in translating academic research into practitioner contexts. Links with academics are crucial to many consultancies in building their credibility and in accessing latest thinking within their area of interest. A number of practical recommendations are made for improving academic/practitioner engagement. Specifically, these relate to: a) using the full range of routes to engagement to both develop research agendas and to disseminate findings; b) revising the way academics are motivated and rewarded to encourage engagement with practitioners, policy makers and intermediaries.

Hughes, T. Bence, D. Grisoni, L. O'Regan, N. and Wornham, D. (2011) “Scholarship That Matters: Academic/Practitioner Engagement in Business & Management” Academy of Management Learning and Education, Vol 10 No1.