

**DEVELOPING A TAXONOMY OF INTERVENTIONS USED TO
INCREASE THE IMPACT OF RESEARCH**

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Since the 1990s there has been an increasing role for evidence in public sector policy and practice. The *Modernising Government* agenda demands that policy be evidence-based, and this has been accompanied by similar calls for the use of evidence by practitioners to support a rational and optimal approach to public service delivery. However, it is increasingly recognised that simply improving the content and availability of the evidence base is not sufficient to secure such changes. Explicit and active strategies are required to ensure that research really does have an impact on policy and practice.

A wide diversity of approaches to enhance the impact of research has emerged in response to this need. Strategies vary in terms of the scale of the project and resources involved, the targets for research impact, the nature of impact intended and the implementation context. We can also distinguish between approaches in terms of those activities undertaken within the research community to "push" research out to potential users, and those undertaken in practice and policy contexts to encourage demand for and uptake of research findings. To help systematise current thinking about research impact and draw together evidence of effectiveness of different approaches, it is useful to develop some categorisations of these diverse initiatives and practices. This paper presents a taxonomy of interventions to enhance the impact of research on public sector policy and practice which has been developed by the Research Unit for Research Utilisation (RURU) at the University of St. Andrews.

One taxonomy already widely used in the research impact field is that developed by the Effective Practice and Organisation of Care (EPOC) review group within the Cochrane Collaboration (see Appendix I). This categorisation reflects the nature and concerns of EPOC's remit to address how to improve the practice of healthcare professionals. RURU's taxonomy, by contrast, is cross-sectoral and is concerned more specifically with increasing the impact of research. It covers a wide range of policy, practice and organisational targets for research impact. Further, it is not solely concerned with interventions to change behaviour, but also includes approaches which encourage more conceptual or "enlightenment" uses of research in changing knowledge, understanding and attitudes.

Developing the taxonomy.

RURU's taxonomy of interventions was developed primarily from the literature on implementing evidence-based policy and practice. One of the key tasks of the Research Unit for Research Utilisation has been to build a register of studies relevant to increasing research impact in order to provide a research resource for this field. The register comprises empirical, conceptual and descriptive papers which reveal the wide range of activities within the research impact arena. These papers, numbering over 650, have been retrieved through extensive and comprehensive searches of the research impact literature within the criminal justice, health, education and social care sectors¹.

¹ Details of searches conducted for the RURU register of studies to date are given at Appendix II. We hope to make the register of studies available for online searching soon.

In developing the taxonomy we examined a sample of 100 papers selected for inclusion in the register of studies which either evaluated or described specific interventions to enhance the impact of research. In addition, we drew on findings from a cross-sector research review conducted on behalf of the Learning and Skills Development Agency (LSDA) as part of a consortium together with the Policy Studies Institute, Leeds Metropolitan University and Queen Mary, University of London².

From these sources, a list was compiled of discrete individual practices and "packages" of activities which have been used to try to increase the impact of research on policy and practice. These interventions were defined at the simplest possible level at which they could be implemented. For example, a single practice might involve developing summaries of research findings for a practitioner audience. However, there were cases where it was meaningless to separate out these kinds of individual practices from the wider "package" in which they were delivered. For example, the effectiveness and value of individual activities within a partnership initiative, such as research-practice meetings or the development of shared research tools, depends in part on the wider context of the partnership itself: their impact cannot be measured independently. In such cases these activities were not identified as stand-alone interventions. The same was true, for example, of organisational interventions involving a range of linked changes to working practices and structures.

The resultant list comprised nearly 200 individual practices or packages of activities, defined as **single interventions**. These interventions were then categorised in two ways:

1. through an iterative process which aimed to group those interventions which appeared broadly similar in form and content. For example:
 - seminars and conferences provide some form of oral re-presentation of research findings to a potential user audience
 - partnerships, consortia and the involvement of practitioners in the research process all involve collaboration between researchers and potential users.These categories comprise **intervention types**. Appendix III provides a full list of intervention types identified and examples of individual interventions within them.
2. in terms of the implicit or explicit mechanisms which interventions used to try to increase the impact of research. The wider theoretical frameworks in which interventions were embedded were also thereby identified. In this way, 8 **mechanism** categories were developed which reflect the mechanisms which drive research impact in different interventions:
 - Dissemination
 - Education
 - Social influence
 - Collaboration (between researchers and users)
 - Incentives
 - Reinforcement
 - Facilitation
 - Multifaceted initiatives.

These 8 categories are outlined in more detail below.

² The results of the overall project are reported in Nutley, SM, Percy-Smith, J and Solesbury, W (2003) *Models of research impact: a cross sector review of literature and practice* (Learning and Skills Development Agency).

1. *Dissemination*

Dissemination comprises those interventions which involve presenting or circulating research findings in more or less tailored form. This includes both written materials, such as summaries or guidelines, and oral presentations, such as seminars or workshops. There is no additional attempt to encourage the uptake or use of research. They aim primarily to inform potential users about research and to persuade them of its value, with a view to changing knowledge, attitudes and ultimately behaviour. The underlying mechanism of dissemination strategies lies in the research-based **message** they embody. The extent to which dissemination interventions are tailored to potential users can vary considerably. They may be delivered to a carefully targeted audience, for example mail-outs of findings to specific policy makers. The key messages can also be tailored to users, for example by providing explicit recommendations for practice.

Dissemination interventions are underpinned by adult learning theories which argue that personal motivation is important in achieving behaviour change. Practitioners are viewed as active consumers of new information who will keep up to date with research findings as a means of professional development. Cognitive theories of rational information seeking and decision making also support dissemination strategies. Both theoretical frameworks assume that with effective dissemination, behaviour change will follow.

2. *Education*

Education interventions use educational approaches which require more active participation by professionals than simple dissemination. These may range from didactic approaches such as traditional lectures, to more interactive sessions which offer the chance to relate research findings to daily practice. Educational interventions are often linked to wider learning or professional development opportunities. The underlying mechanism is **learning**: increasing knowledge and understanding of research findings. Educational interventions are not generally concerned to develop specific skills.

There is a vast array of theories concerning education and how people learn on which educational interventions may be based. Some depend on how the "learner" is conceptualised. For example, technical rationality models, which underpin many passive and didactic educational approaches, focus on education to support systematic problem-solving. The learner is viewed as a "blank slate" on which information is inscribed. More active models of learning identify the "learner as sponge", unevenly soaking up information, or the "brain as computer", systematically processing the form, if not the content, of information (NCDDR, 1996).

Interventions may also address specific educational principles which flow from a range of learning theories. For example, the individualisation principle suggests that individuals learn at different rates and in different ways, and approaches need to be targeted accordingly. Relevance to learners and consonance with intended outcomes are also important to success (Granados, 1997).

3. *Social influence*

Research impact interventions may also use the influence of others, such as colleagues and role models, to inform potential users about research and to persuade them of its value. The underlying mechanism here is **social influence**: changing norms and values as a route to changing behaviour. This may involve lobbying of policy makers or practitioners. In healthcare, patient-mediated interventions provide

research-based information to patients who can then try to influence doctors' practice. Opinion leaders, individuals with a particular influence on the beliefs and actions of their colleagues, have also been used among healthcare professionals to try to secure research-based practice.

These approaches are underpinned by social influence and social learning theories which propose that where information resonates with existing norms and values, it is more likely to change behaviour. The opportunity to discuss new information with peers provides the chance for social influence to be exerted or for a consensus to develop. Similarly, diffusion of innovations theory views the adoption of an innovation as an essentially social process in which subjective evaluations will be sought from peers.

4. *Collaboration between researchers and users*

Collaborative interventions aim to enhance research impact by strengthening the links between practitioners, policy makers and researchers. The underlying mechanism is **communication**: improving the flow of information and ideas between researchers and potential users. These approaches aim to break down or overcome barriers arising from differences among these groups, for example in culture, timescales and values, through increased interaction, joint working and the exchange of knowledge and skills.

Interactive approaches are grounded in constructivist theories of learning which assume new knowledge is filtered, shaped and reconstructed through pre-existing understandings and experience. Users thus need to adapt and re-negotiate findings from research in terms of local policy and practice contexts. Huberman's (e.g. 1993) model of "sustained interactivity" emphasises the importance of linkage mechanisms between research and user communities. It is grounded in social learning theory which views knowledge as socially constructed and argues that shared meaning will develop through processes of social interaction. This process can facilitate testing and adapting research findings in practice through "tinkering", which melds explicit and tacit knowledge and contributes to knowledge creation (Hargreaves, 1999). Theories of reflective practice (e.g. Schon, 1991) are also relevant here.

5. *Incentives*

Incentive-based interventions provide some form of encouragement or reward for activities to enhance research impact, or for behaviour in line with best evidence. The underlying mechanism is **motivation through reward**: ways of acting will be more likely to recur when they are followed by positive consequences. Rewards may be straightforwardly financial, or may take the form of some other benefit or gain such as an increase in professional status. The latter may occur, for example, where obtaining research funding is dependent on conducting research impact activities. The use of incentives is based on learning theories which propose that behaviour can be influenced by controlling motivation through internal and external stimuli. Rewards are an important part of reinforcement for learning. Economic models of rational behaviour which elevate extrinsic reward over intrinsic motivation also apply. Theories of power are necessarily implicated in such coercive approaches to enhancing research impact.

6. *Reinforcement*

Reinforcement interventions aim to encourage appropriate, research-based behaviour by presenting information about behaviour to individuals or groups, whether before, during or after that behaviour. Audit and feedback and reminders are the main

approaches here. The underlying mechanism is **reinforcement through information**.

Reinforcement and feedback are key principles in diverse learning theories (Granados, 1997). They facilitate learning by providing information on behaviour and progress. Audit and feedback mechanisms also underpin the design of self-regulating systems and are incorporated into ideas of single-loop learning (Argyris and Schon, 1978).

7. *Facilitation*

Facilitative interventions are those which support and enable research-based policy and practice. They provide financial, technical, organisational or emotional assistance to help implement research impact interventions and develop evidence-based policy and practice. This may include training in new skills to support research-based service delivery. The underlying mechanism is **facilitation**: providing the means to take action and removing barriers to that action.

Facilitative approaches are rooted in change management theories that emphasise the importance of enabling strategies which provide practical assistance for individuals and groups to support change. Learning theories of behaviour change also stress the importance of facilitation.

8. *Multi-component initiatives*

Multi-component or multifaceted interventions are those deploying two or more interventions to enhance the impact of research. The impact of these individual interventions cannot be assessed independently. Multi-component initiatives generally target **multiple** mechanisms to try to get research into policy and practice. The theoretical underpinnings of multifaceted approaches will depend on the interventions used. However, overarching, integrated theories, such as the trans-theoretical model, can support this approach (Smith, 2000). Social learning theories also emphasise the multiple variables that influence behaviour change and provide insight into multi-component initiatives.

The taxonomy thus has a 2-fold structure. Single interventions, such as workshops, journal clubs, opinion leaders or action research, can be categorised in terms of

1. **Intervention type** - grouping interventions which are similar in form and content.
2. **Mechanism** - grouping interventions in terms of their underlying mechanisms and theoretical frameworks.

Importantly, these categories exist in parallel, rather than as a hierarchy. Intervention type does not always predetermine the underlying mechanism(s), and the categorisations are not mutually exclusive groupings. For example, where seminars with researchers presenting findings to users adopt a highly discursive model, there may be considerable exchange between the two groups and the beginnings of research translation to the local practice or policy context. Here, dissemination shades into a more interactive and collaborative approach. This enables a useful degree of flexibility in categorising interventions.

Three examples are provided below to help illustrate the use of the taxonomy in practice.

Example 1.

Bogensneider (2000) describes the Family Impact Seminar series based in Wisconsin, an ongoing series of seminars, briefing reports and follow-up activities which provide up-to-date, solution-oriented information aimed at bringing a family focus to policy making. Targeting a wide range of state

policymakers, the series involves 2-hour seminars comprising 3 20-minute presentations provided by a panel of academics and policy analysts plus time for questions. For each seminar, supportive material in the form of audio tapes and background briefing reports are made available.

In terms of the taxonomy, the intervention type here is **oral presentation**. The audio tapes and background briefing reports offer supportive material to the main intervention rather than being its primary form. Many interventions to increase research impact include some kind of written supportive materials alongside the main intervention but these are not designed as stand-alone pieces. Only where these written materials provide the sole or primary form of the intervention, for example the simple provision of summary reports of research findings to practitioners, would they be categorised as an intervention type.

The underlying mechanism for the seminars is **dissemination**. The seminars provide research information to policy makers primarily through oral presentations, and there is no additional attempt to encourage the uptake or use of research.

Example 2.

Davis (1997) reviewed the literature relating to the implementation of guidelines. He found that interventions where guideline implementation was supported by reminder systems were generally effective.

There are two intervention types here. The first is **research-based guidance**. In this example, the guideline does not simply play a supporting role, but is a key part of the overall intervention. The second is **reminders**.

The underlying mechanism here is **reinforcement**. Although guidelines re-present research findings in the form of tailored written materials, the intervention here is not based on simple dissemination mechanisms: adherence to the guidelines is encouraged through the use of reminder systems.

Example 3.

Shanley (1996) describes a 6-month project to disseminate research findings run by the Australian Centre for Education and Information on Drugs and Alcohol (CEIDA). This involved an informative and interactive workshop programme developed in 2-day and several other formats. Workshops aimed not just to impart information but to promote discussion, challenge and share ideas and to look for practical ways the research recommendations could be used. They included:

- *sessions summarising key recommendations*
- *an interactive session where participants could explore and express attitudes concerning the relationship of research to practice and policy*
- *use of case vignettes and group problem-solving to explore implementation within participants' own work setting*
- *a final session where participants could discuss the recommendations most important to them and any strategies for change they might need to adopt.*

Guidelines and workshop handouts summarising the recommendations were also distributed to participants.

The intervention is described as a workshop: these tend to involve more active discussion and opportunities to relate research findings to practice than seminars or conferences. The intervention type is **interactive education**. Again, guidelines and summaries provide supporting materials, not the primary intervention.

In practice, the project uses three key mechanisms to try to increase the impact of research. The first is simple **dissemination**: presentations by researchers summarising the key recommendations. The second is **education**: interactive sessions requiring professionals to participate actively through the use of case vignettes and group problem-solving to relate the research findings to everyday practice. The final mechanism is **collaboration**. There are interactive sessions between researchers and potential research users, both to enable practitioners to examine their own attitudes to the use of research in policy and practice, and also to allow them to explore with researchers how to adapt findings to their local practice contexts.

Any taxonomy inevitably creates fixed and bounded categories where the reality is typically more blurred. Interventions may overlap or else shade into other broad-based groupings. As demonstrated in the examples above, the taxonomy does however provide a degree of flexibility because its categories are not mutually exclusive.

Uses and limitations of the taxonomy.

RURU's two-fold taxonomy aims to offer a useful theoretical and practical tool for both thinking about the research impact field and for developing and implementing research impact interventions. As such, it also provides a basis for annotating and indexing papers within RURU's own register of studies.

The development of the taxonomy was shaped in part by the nature of the research impact literature. The papers examined varied in the extent to which they described specific interventions in any depth. Details such as whether a "workshop" primarily involved didactic presentations or went further and enabled discussion of findings with users to help translate and adapt the research in a local context were not always available. This was particularly true of review papers where a level of categorisation had often already been imposed in grouping similar studies for synthesis. In a few cases it was necessary to adopt some of the categorisations already inherent in the literature. In the healthcare field, from which the majority of research impact papers were derived, these generally reflected the EPOC taxonomy given in Appendix I.

Despite this, the particular strength of the RURU taxonomy lies in its theoretical basis. Each intervention can be categorised and understood in terms of the primary mechanism(s) through which research is intended to have an impact. This also helps elucidate the kinds of research impact which might be achieved with different interventions, in particular whether interventions are oriented towards increasing conceptual research use - changing knowledge, understanding and attitudes - or whether they aim to have a more direct, or instrumental, impact on behaviour. The taxonomy thus has practical as well as conceptual value, in helping plan and select appropriate strategies for encouraging evidence-informed policy or practice, and in directing attention towards and helping to understand the context of research implementation.

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APPENDIX I.

EPOC (Effective Practice and Organisation of Care) taxonomy of interventions aimed at achieving practice change

PROFESSIONAL INTERVENTIONS

- Distribution of educational materials
- Educational meetings
- Local consensus processes
- Educational outreach visits
- Local opinion leaders
- Patient-mediated interventions
- Audit and feedback
- Reminders
- Marketing
- Mass media

FINANCIAL INTERVENTIONS

- Provider interventions
- Patient interventions

ORGANISATION INTERVENTIONS

- Revision of professional roles
- Multidisciplinary teams
- Formal integration of services
- Skill mix changes
- Continuity of care
- Interventions to boost morale

- Communication and case discussion

PATIENT-ORIENTED INTERVENTIONS

- Consumer participation in governance of healthcare organisation
- Mail order pharmacies
- Mechanisms for dealing with patient suggestions and complaints

STRUCTURAL INTERVENTIONS

- Changes to site/setting of service delivery
- Changes to physical structure
- Changes in medical records systems
- Changes in scope and nature of benefits of services
- Presence and organisation of quality monitoring
- Ownership of hospitals and other facilities
- Staff organisation

REGULATORY INTERVENTIONS

- Changes in medical liability
- Management of patient complaints
- Peer review
- Licensure

(from Davies et al., 2000)

APPENDIX II.

Search sources used to compile the Research Unit for Research Utilisation (RURU) register of studies

- Databases:
 - general databases: Web of Science, BIDS (via Ingenta), Expanded Academic ASAP International, Science Direct, PAIS, SIGLE (for grey literature)
 - education: ERIC, Education-Line
 - health: HMIC - King's Fund and Department of Health
 - social care: Caredata, Social Care Group
 - criminal justice: Criminal Justice Abstracts
 - database searches of the UK Network for Evidence Based Policy and Practice bibliography and the NCJRS database (criminal justice)
 - the REGARD research register
 - MEDLINE searches restricted to studies indexed as "review" or "meta-analysis"
- reference lists from health care reviews and overviews
- searches for studies of key health care research impact initiatives on MEDLINE and the web
- extensive searches of web sites of key organisations and local and national government plus onward links
- ZetocAlert alerting service
- personal contacts.

APPENDIX III.

List of intervention types identified, with examples

Written materials

Presentation of research findings in written formats:

- publication in journals
- bulletins
- summaries
- briefing reports

Oral presentations

Oral presentation of research findings:

- seminars
- conferences

Alternative formats

Presentation of research findings using alternative formats:

- videos
- audio tapes
- electronic/online versions

Mass media

Use of the mass media to present and circulate research findings:

- TV
- radio
- magazines

Research access

Improving access to research findings:

- circulation of research
 - intra-organisational distribution of research
 - by individuals
 - by information services
- encouraging discussion of research
 - journal clubs
 - e-mail discussion groups
- database access
 - online database access
 - conducting searches for individuals

Research-based guidance

Preparing and providing guidance for practitioners and policy makers based on research findings:

- good practice guides

- consensus recommendations
- guidelines

Educational materials

- printed educational materials

Passive/didactic education

- lectures

Staff development and training

- continuing professional development
- training staff in critical appraisal skills
- training staff in delivering evidence-based services

Educational outreach

- academic detailing (face-to-face visits to practice settings by trained individuals to try to change practitioner behaviour)

Interactive education

- workshops

General education

Educational approaches, no details or insufficient details given:

- small-group teaching
- educational meetings

Endorsement

Endorsement for research findings, for research-based guidance or for practice or policy based on research:

- opinion leaders
- product champions
- endorsement by professional organisations (of evidence/research impact activity)

Lobbying

- top 10 letters to top 10 most influential/relevant policy makers
- lobbying local and national government

Client-mediated interventions

Attempts to secure evidence-based practice or policy indirectly via influence of clients:

- patient-mediated interventions: research information given to patients through leaflets or counselling

Boundary spanners

Development of individual roles which span research-user contexts:

- lecturer-practitioners
- policy brokers

Networks

- research/policy networks
- practitioner networks for disseminating research findings

Provision of expert support

Expert support for research impact activities:

- research support for practitioners to conduct research or to test out research findings in practice contexts
- information scientists to assist search for relevant research

Research-in-practice

Testing research findings in local contexts, conducting and applying research, researching current or new practices:

- practitioner testing of or "tinkering" with research
- action research

Research planning

Planning research programmes and projects to ensure relevance to user communities:

- involving policy makers in defining and managing research programmes
- business plans ensuring future research responds to clients' needs

Collaboration

Researchers working with user and client communities to enhance the relevance and impact of research:

- partnerships between researchers and users - and the community
- involvement of stakeholders in defining research topics and format

Research incentives

Incentives for researchers to engage in research impact activities:

- research funding criteria - requirements for research impact activity
- providing/increasing budget for research impact activities for researchers

Financial incentives

To use research, or to develop evidence-based policy or practice:

- implicit financial incentives
 - fee-for-service

- explicit financial incentives
 - bonuses
 - withholdings

Feedback (alone)

- peer comparison feedback
- cost information feedback
- audit and feedback

Reminders

- prompts
- alerts

Changes in structures

Structural changes in organisations to try to enhance the impact of research on potential users:

- devolution of research from centre to regions to work alongside practitioners
- researchers working alongside practitioners and policy makers in project teams

Office systems

- office tools
 - chart flow sheets
 - checklists

Computer support systems

- software packages for storing, updating and accessing research information
- software packages to support process of developing and implementing evidence-based programmes for service delivery
- computer support systems for
 - patient reminders
 - provider reminders

Use of internet/intranet

- use of intranets to disseminate research
- use of intranets for managing research/practice projects
- e-mail co-ordination across locations
- e-mail discussion groups

Quality improvement initiatives

- continuous quality improvement (CQI)
- total quality management (TQM)

Organisational

- changes in leadership
- development of communication channels

Multi-component initiatives

Use two or more interventions to enhance the impact of research:

- multifaceted interventions
- organisations and agencies developed to support enhanced impact of research on policy and practice