The impact of research on decision-making by practitioners and managers

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Does research have an impact on decision-making at the level of practitioners and managers; and, if so, through what pathways? Previous studies have shown that the relationships between research and its decision-making outcomes are almost always complex and not easily discerned. The idea of a one-to-one relationship generally has been discredited, although individual studies can have an impact. Studies have concentrated at the policy level rather than on practitioners and managers. This paper draws on a range of recent Australian studies in VET and healthcare. The second section of the paper outlines a framework for analysing the relationships between research and decision-making by practitioners and managers, distinguishing between the decision-making domain, the research domain and the linkages between them. It also discusses the definition of research; and draws a distinction between 'use' and 'influence'. Section 3 outlines the relevant studies in VET from which evidence was drawn, while Section 4 outlines the sources from which evidence was drawn for Australian healthcare. Section 5 considers the similarities and differences in the relationships between research and decision-making by practitioners and managers in the two sectors. There are five concluding comments in Section 6.

1. Introduction

In Australia and overseas, several questions have been of interest: Do research and development (R&D) affect policy or practice? If so, through what pathways? Can relationships be improved? For example, the OECD has shown considerable interest, as have North American and European commentators. In Australia, the issues have been of interest to researchers and also to decision-makers (Selby Smith et al 1998). The present paper is primarily concerned with the impact of R&D on decision-making at the practitioner level and illustrates the discussion from studies in the healthcare and vocational education and training (VET) sectors. The discussion is not intended to imply that the relationships are straightforward, since they can be complex, discursive, negotiated, continuing and iterative (and the context can also be changing).

Previous studies have shown that the relationships between R&D and its decision-making outcomes are almost always complex and not easily discerned. The idea of a one-to-one relationship between R&D and decision-making generally has been discredited, although individual studies can have an impact. Nevertheless, there is an acceptance of differences between the R&D and decision-making domains; and of the importance of linkages between them. Thus, reviewing the evidence for and where possible evaluating the extent of influence of R&D on decision-making in healthcare or VET necessitates consideration of

three areas: decision-making; R&D; and the linkages between them. The perspective of decision-making is adopted here, since earlier studies have indicated that the perspective from R&D can narrow the investigator's focus, overstating research's impact (the 'key hole' problem) and underestimating the complexity of decision-making.

The impact of R&D on decision-making is defined to incorporate two elements: 'use' - ie whether the R&D served a particular decision-making purpose, such as to solve a problem, or served as a weapon in political or bureaucratic conflict or improved conceptual understanding; and 'influence' - ie whether the R&D made a difference to the decision which was made. Thus, R&D can be used in decision-making even if it does not have an influence, although the counterfactual may be difficult to establish. Secondly, R&D can influence decisions **not** to act as well as decisions to act. Thirdly, even when R&D is used by decision-makers, or has influence on them, they may not explicitly recognise it.

The paper is divided into six sections, of which this brief introduction is the first. The second section considers the framework adopted for analysing the relationships between R&D and decision-making. Section 3 outlines the sources of the evidence for VET, while Section 4 discusses the sources for healthcare. Similarities and differences in the relationships between R&D and decision-making by practitioners and managers in the two sectors are considered in Section 5. There are five concluding comments in Section 6.

2. The framework for analysis

Decision-making

Ham and Hill (1993) argue that the study of decision-making should concentrate on analysing three areas: the process by which decisions are made; the distribution of power; and the assumptive worlds of key participants in the decision-making process. In terms of the *process*, Palmer and Short (1994) argue that decision-making is often characterised by a number of stages; and R&D can play a part at each stage (see also Rist 1996). For example, R&D can be used at the problem identification and agenda setting stage; in the subsequent phase of deciding on the course of action to be adopted; and at the monitoring and evaluation stage, which provides opportunities for program fine-tuning and adjustment to changing circumstances. Robinson (1998) has argued that there are a variety of decision-making processes, which can incorporate R&D very differently. For example, pragmatic decision-making characterised by no systematic consultation or research (although R&D may be used in an ad hoc way to support one stance or denigrate another) is contrasted by Robinson with other decision-making processes, including the systematic investigation of existing R&D (and even commissioning of more). Many of the decision-makers consulted during the empirical investigations identified the complex, changing and time-pressured nature of their operating environment as an important factor in not directly considering R&D evidence before taking decisions. The timeframes of research were seen to outlast those of policy-making, so that results were often 'too late'. Relatedly, there had been substantial staff turnover, reducing the impact of accumulated knowledge, skills and attitudes (Selby Smith et al 1998).

Secondly, the distribution of *power* among the key stakeholders who participate in the decision-making arrangements can affect the likelihood of R&D influencing decisions,

especially if the stakeholders vary in their attitudes to R&D and its potential use in decision-making. In both healthcare and VET, decision-making can be mediated through complex structures and arrangements; for example, in TAFE institutes or teaching hospitals. Often decision-making is contested; for example, between different levels of decision-makers, between public and private providers and between professional and managerial perspectives. There is additional complexity when the distribution of power between key stakeholders changes; as it did following the election of the Howard Government in March 1996. In such a complex and dynamic environment there can be many openings for R&D to influence decision-making. Of course, the role of R&D may be overshadowed by other factors.

Thirdly, there are the *assumptive worlds* of key individuals and organisations involved in the decision-making process. The studies considered in Sections 3 and 4 suggest that there are significant differences in the assumptive worlds of key stakeholders in healthcare and VET. And in both sectors public service downsizing has reduced the role of research branches, distancing policy-makers further from R&D, managers and practitioners. There was evidence of differences in the assumptive worlds of key decision-makers, too, at the different levels of decision-making. In practice, and perhaps particularly among practitioners and managers, formal R&D-based evidence is often supplemented by local experience and knowledge.

Three other points are briefly noted. First, at the level of healthcare and VET providers there has been a considerable increase over recent years in competitive pressures accompanying regulatory reform. The case studies of individual providers, while reflecting specific factors in particular contexts, underlined the importance of a decision-making environment predisposed to give audience to R&D findings, the contributions of key individuals rather than formal structures, and the cumulative contributions to organisational effectiveness and practitioner competence from successfully applying R&D to decision-making.

Secondly, globalisation and increased international competition are leading to the closer integration of a range of policies to enhance efficiency and innovation, including in healthcare and education. Some of the main drivers of healthcare and VET policy and practice originate outside those two sectors; and in these other areas, important developments are influenced by R&D activity and knowledge accumulation. It follows that R&D not specifically directed at healthcare or education can significantly affect decision-making there. Examples include competition policies, developments in financing arrangements or human resource management approaches, and changing perspectives on the appropriate balance between producer and consumer interests. Both the healthcare and education systems require a capacity to translate relevant R&D undertaken elsewhere, from both domestic and international sources, so that it can be applied effectively in local circumstances.

Thirdly, there are indirect as well as direct links between R&D and decision-making at all levels, including decision-making by managers in provider organisations and by individual practitioners. Each stakeholder organisation uses R&D to advance its own interests, deploying a wide range of information, including R&D-based information, in their engagement with current political and policy debates. They also use R&D for

communicating with constituents and for other purposes, including industrial negotiations. They seek to influence the broader research agenda. Also, the wider community's call for change rather than direct R&D evidence, can produce modifications in decision-making by provider organisations or practitioners. 'Clamour' (Postlethwaite 1984) can both initiate research and be driven by it. Here, R&D has an impact on decision-making which is indirect and mediated through the media, the judiciary, community activity, public opinion and the political process.

We suggest that researchers should have 'suitably modest' expectations about the contribution of R&D to decision-making, including by managers and practitioners, since R&D is only one of a number of sources of information available to decision-makers, and information from all sources is only one of many inputs into the decision-making process. Brown (1991), considering healthcare decision-making in the US, concluded that 'on a good day, ideas (information) may gain a hearing amid the swirl of political considerations, but it must be a very good and rare day indeed when policy-makers take their cues mainly from scientific knowledge about the state of the world they hope to change or protect'. Two-thirds of the senior decision-makers in VET who were surveyed considered that, in reaching decisions, political and strategic considerations played the greatest role, with research-based information being used in half the cases described to support a decision already taken (Selby Smith et al 1998). And Boud et al (1997) argue that, at the level of education providers and practitioners, decisions tend to be made according to past practice, perceptions of industry needs and local constraints, rather than based on research.

R&D

Research in healthcare and education is 'so diverse and includes so many approaches that we are not communicating well if we just talk about "research" with a capital "R"' (Anderson 1998). The Australian Bureau of Statistics (1993) defines research (R&D), by reference to the OECD Frascati Manual, as comprising 'creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this knowledge to devise new applications'. Thus, R&D focuses on studies characterised by originality; it has investigation as a primary objective; and research shades into development and application. 'R&D' has three main outputs. First, it provides new knowledge and applies existing knowledge in new ways, including for new audiences and in new settings. A second output consists of research skills and attitudes: an approach, a way of doing things or of assessing alternative sources of information. R&D creates human capital as well as knowledge. The third output is appropriately educated people, who are critical for the effective operation of the research system and improved decision-making. Most 'impact' studies concentrate on the knowledge creation aspects of research. Since R&D involves an aspiration to truth, it precludes conclusions being reached before the evidence is examined or despite it (Weiss 1991).

The OECD and the Australian Bureau of Statistics classify R&D studies by type: basic research; strategic research; applied research; and experimental development (Australian Bureau of Statistics 1993). Research in healthcare and VET can be distributed among the four types. Three significant implications arise. First, one would expect different *levels* of impact for the different types of research. For example, R&D which specifically addresses

a current problem clearly defined by users is likely to be thought 'more relevant', particularly in the short term, than research intended to expand decision-makers' conceptual understanding. Secondly, one might expect different *patterns* of impact between the types of R&D in various decision-making situations. For example, national and State level decision-makers might be expected to attach higher priority to strategic research and less to developmental activities - and the reverse for providers, because the former tend to be less concerned with detailed implementation and more with strategic questions (and conversely for managers and practitioners). Also, different patterns of R&D impact would be expected at different stages of the policy cycle. Thirdly, *perceptions* of use and influence tend to vary among types of R&D. Even when information from a research study is used or has an influence on decision-making, this may not be visible to a particular stakeholder. Note, however, that research skills and attitudes can be used in all decision-making settings (and in the research system itself).

The accumulative nature of R&D means that, while an individual study can have an impact on decision-making, this tends to be the exception not the rule. Trace-back studies suggest greater research impact, particularly from basic R&D, than forward-looking studies. Viewing research 'as a process of debate' (Klein 1990) or conceptualising a 'knowledge reservoir' (Buxton and Hanney 1997) highlights the value of an ongoing research capacity from which decision-makers can draw.

Educational research and R&D on the healthcare system employ a wide range of approaches. Since different research questions benefit from different techniques and methodologies, it is important to match the approach to the problem. When a particular disciplinary approach is adopted, this influences the problems identified, the questions posed, the techniques adopted to investigate them, the way in which results are reported and the audiences with whom researchers interact. To the extent that the issues concerning decision-makers warrant attention from more than one disciplinary perspective, researchers require not only competence in their discipline, but other skills and personal characteristics to enable them to collaborate effectively.

R&D is carried out in various locations. Indeed, it can be argued that anyone with relevant skills can carry out R&D and they can do it anywhere. However, there are advantages in carrying out particular types of R&D in the different locations. Each location tends to specialise in particular types of research; produce different combinations of research outputs; and attract particular types of researcher. The great majority of R&D by practitioners appears to represent the actions of individuals seeking to improve the operation of an activity with which they are involved; these studies are often relatively brief in duration and produce either no report or one which has only limited circulation. There is a balance to be struck, from the overall societal viewpoint, among the different types of research and, by implication, among the different locations.

Of course, research is not solely to provide information for decision-making, especially if the relationship is conceived as narrowly instrumental and short term (West 1997).

Linkages

The impact of R&D on decision-making is affected by the linkages between research (and researchers) and decision-making (and decision-makers). Contact between the two

domains, not only at the close of a study, but also before and during its conduct, can strongly affect impact. The contacts can even establish 'multiple areas of collaboration between the two parties which transcend the impact of a single study' (Huberman 1990). Linkages between the two domains can be facilitated through particular institutional arrangements, key stakeholder organisations, other interest groups and the media, and funding arrangements, so that linkages are conceptualised better as a 'web' or 'network' (Selby Smith et al 1992). To stress the concept of linkages is to be concerned with facilitating the establishment of multiple areas of collaboration between researchers, policy-makers, managers and practitioners, given the multiple pathways through which research can influence policy and practice. Linkages can also be a means of ensuring that researchers address the 'right' questions.

The literature on the web of linkages is sparser than that on decision-making or research. Linkages have a two-fold task: to transmit information from potential users of research within the decision-making system to researchers about the R&D needed for decision-making; and to transmit to potential users information about relevant R&D which has been undertaken within the research system. One defining characteristic of linkages is information flows; of which there are many forms: formal or informal, direct or indirect, long term or immediate. Although linkages are established because one party, usually decision-makers, wants to gain access to improved information or knowledge, this presupposes that decision-makers know what they want; that researchers understand *which* decision-makers want *what* research, and *when*; and that researchers wish to respond and are able to do so. These conditions are frequently not satisfied. The web of linkages can have an international dimension. Huberman has stressed 'sustained interactivity' for achieving instrumental change.

The literature has tended to focus on linkages involving information flows, with greater recognition only recently of tacit knowledge and the movement of people. When research occurs in decision-making settings, such as at the practitioner level, the linkages between R&D and decision-making tend to be closer and there is a greater likelihood of external research also being taken into account.

Two other matters are noted. First, since there are likely to continue to be significant differences between the research and decision-making communities, there is a role for research 'brokers' to facilitate the exchange of information, skills and attitudes between R&D producers and potential users (Buxton and Hanney 1994). Secondly, the increasing tendency by decision-making organisations to outsource R&D does not remove the need to retain an integrative, translating and coordinating function within agencies. They need to be able to ask the appropriate questions, assess the evidence, and know how and when to use it.

Levels of decision-making

Three levels of decision-making were distinguished: national or State level; the level of individual healthcare or education and training providers; and practitioners (such as doctors and other health professionals or teachers). This paper focuses primarily on the latter two levels of decision-making.

3. Evidence from VET

The evidence is drawn from three main sources. First, a study was commissioned by the Australian National Training Authority Research Advisory Council in 1996 (Selby Smith et al 1998). Secondly, a two-day symposium was held in Melbourne during February 1997 as part of that project (Selby Smith 1998). Thirdly, seventeen case studies were undertaken, using a consistent methodology (Selby Smith 1999). Material is drawn from these three sources relating particularly to VET practitioners and to managers in provider institutions, using five complementary approaches.

First, there was a review of relevant literature, noting that there is no single approach to the issue of the impact of research, either generally or specifically in VET (Selby Smith et al 1998).

Secondly, a symposium was held, to identify key issues promptly and enable different perspectives and approaches to the research question to be drawn on as appropriate. Sessions considered the impact of research from users' perspectives at the State / Territory and national levels (Session 1); at the provider level (Session 2); and in terms of interactions between VET and the wider economic, political and societal systems (Session 5). Perspectives were also sought from researchers working in a range of research settings, including in VET research institutions (Session 3) and in other settings, such as private consultants, as expert advisers and in the formal inquiry process (Session 4). Similar studies have been undertaken in other areas of public policy, for example, in health and in other areas of education. Researchers from these areas reported on their findings in Session 6. Presenters from the United States and New Zealand added an international perspective. Some additional matters were raised in the final plenary session. The broad parameters of the research study, including key terms which required definition, were set out in a background paper circulated to participants prior to the symposium and on which they were invited to comment.

In the event, the symposium proved to be more fruitful than anticipated. Not only were many issues that could assist in understanding the relationships between R&D and VET decision-making identified; there were three additional outcomes. First, the symposium process was interactive, dynamic and cumulative; one of mutual learning for those prepared to put their cognitive maps in jeopardy. Secondly, the considered views and material offered by symposium participants facilitated the development of responses to the research question. Thirdly, the discussions provided insights beyond the specific questions raised by the funding body, in particular ways of improving the relationships between research and VET decision-making.

Thirdly, two quantitative studies were undertaken by members of the Research Centre on VET at the University of Technology, Sydney, who were in the research team. The first study sought to collect and analyse Australian research activity in VET 1988-1996. 1068 different significant research activities were identified as having commenced, including 205 examples of local research projects (although RCVET commented that 'the information about these was extremely mixed both in quantity and quality') and eight research programs were identified (four within universities). The second study was based on semi-structured telephone interviews with fifty VET decision-makers. The sample included

major decision-makers in VET (such as senior or middle level bureaucrats in national, State or Territory VET authorities, senior managers in VET providers, and key office holders in industry organisations) and decision-makers in providing training, such as heads of department in VET providers and human resource managers or training managers within enterprises. Thirty-six percent of the sample were classed as senior decision-makers, 42% as middle-ranking and 22% as lower ranking decision-makers. The detailed results are in chapters 4 and 5 respectively of Selby Smith et al (1998).

Fourthly, case studies were conducted to explore the influence of the factors identified in the literature and in discussion at the symposium in the context of particular situations. The original nine case studies (Selby Smith et al 1998) were subsequently expanded to seventeen (Selby Smith 1999). The case studies are complementary to the study reported in the 1998 book and a consistent approach informs the different perspectives which were used. The drafts were discussed at a workshop prior to completion, and authors had the opportunity to revise their drafts in the light of discussion there, if they wished. Surveys and case studies, taken together, allow for a more complete understanding of the relationships between R&D and decision-making than either can alone. Surveys and case studies build on the advantages and tend to offset the disadvantages of each other. Many of the R&D projects examined in the case studies were initiated by users and, hence, may be thought more likely to have a subsequent impact on decision-making. However, some projects were initiated by researchers, and it is of interest whether the mode of initiation affected the subsequent impact on decision-making.

Finally, the research project included reference to overseas experience. A paper setting out preliminary findings was circulated to informed overseas commentators. Their responses, which were most helpful - and generally supportive of the analysis which had been undertaken and the conclusions reached - were incorporated into the final report.

4. Evidence from healthcare

The evidence is drawn mainly from four sources. The first source is a study of the factors influencing the effectiveness of the links between economic evaluation studies on the one hand and changes in health policy and practice on the other (Drummond et al 1991; Selby Smith et al 1994). The study was concerned with planning decisions about which facilities to provide and which programs or therapies to reimburse or fund; and clinical decisions about the care to be given to individual patients. The arguments were illustrated by reference to nine specific Australian examples: extracorporeal shockwave lithotripsy; office pathology testing; magnetic resonance imaging; CT scanning; cervical cancer screening; bone mineral assessment; automated implantable cardiac defibrillators; liver transplantation; and extracorporeal membrane oxygenation. Interestingly, it was found that, since the effects of changes often could not be predicted accurately, they needed to be monitored carefully over a period of time, with consideration given to both processes and outcomes. In general, the value of a once-only assessment was open to doubt; and the responsibility for monitoring, and remedial action as required, fell significantly at the level of healthcare managers and practitioners.

Secondly, a study of health labour force research in Australia was undertaken for the Australian Health Ministers' Advisory Council (Selby Smith et al 1992). From the viewpoint of those managing provider institutions, labour is the largest proportion of their expenditure by far, and health labour is crucial to healthcare outcomes and the processes of care. An inventory was developed of studies undertaken between 1980 and 1991 (Selby Smith et al 1992a) and an investigation was conducted concerning their use in policy, program and administrative action. The discussion is based on analysis of the inventory, six case studies and the search conference. Interestingly, there was considerable restriction on the availability of the research studies, especially by governments and health provider institutions compared to tertiary educational institutions, which suggests that the former studies contribute less than the latter to the accumulating body of knowledge. The inventory tabulations also indicated that R&D initiated independently of the expressed needs of users was less likely to be used; and that users were more likely to be aware of where R&D findings were used, and how, than outside researchers or consultants. Participants at the search conference argued that, compared to education and training, R&D in healthcare institutions and among practitioners appeared to have a higher priority, to be more scientific in orientation, to be more closely linked with users, and to be much better funded (Selby Smith et al 1992, pp 106-115).

The third source was a study of the non-specialist medical workforce in public hospitals (Gadiel et al 1997) funded by the Commonwealth Department of Health and Family Services, which offered public hospitals an opportunity to explore practical solutions to hospital shortages of generalist medical practitioners. In 1995 the program funded 21 pilot projects, each for twelve months. In 1996 a further year of funding was approved for eight projects. The total value of the program was approximately $3.5 million. The main concern of the research program was the career destiny of a group of doctors within public health systems, which included non-accredited registrars, GPs interested in establishing better linkages with hospital practice, and others - often referred to as 'career medical officers'. The strategy behind the program envisaged both an expansion of the role of GPs in healthcare institutions, specifically hospitals, and the development of a comprehensive workforce strategy for non-specialist doctors within public health systems. The program was intended to enhance service access, quality or cost effectiveness.

Given the way the research projects were organised and facilitated, the project findings tended to contribute more to the accumulating reservoir of knowledge available for other decision-makers and researchers than often occurs from R&D in workplaces. Linkages were consciously fostered between researchers and users in the workplace; and between researchers, policy-makers, practitioners and professional associations. The experience of the pilot projects particularly stressed the importance of continuing contacts, a range of activities and follow-up if linkages are to be improved on a long-term basis. Also, the valuable insights and developments which emerged through a particular project could transcend the boundaries of a single R&D study, as in the John Hunter project which created 'a number of potentially useful administrative, operational and educational resources' (Gadiel et al 1997, p 101).

The final source relates to investigations into the incidence of medical benefits fraud and overservicing under the Commonwealth Medical Benefits Schedule in the early 1980s (Commonwealth Department of Health 1982; Joint Parliamentary Committee of Public

Accounts 1982a, 1982b, 1982c; Selby Smith and Corbett 1995). Particular attention is focused here on the relationships between R&D and decision-making by practitioners. The extensive analysis and interpretation of the statistical data on medical service claims on the Commonwealth was conducted within the Federal Department and at a later stage was shared with other agencies, such as the AFP and the A-G's Department, and with the organised medical profession. R&D was involved, including each of its three attributes: improved information; research skills and attitudes; and educated people.

Broad changes in public opinion, legislative policy and bureaucratic administration provided the backdrop against which individual medical practitioners conducted their affairs. The public discussion and Parliamentary and media interest in medical benefits fraud and over-servicing influenced the overall environment in which practitioners operated and, no doubt, influenced their decision-making and practices indirectly. More directly, the Departmental negotiations with the organised medical profession, and the provision of statistical data, interpretative material and government doctor to private practice doctor consultation and education appears to have had some effect on practice patterns. Incentives were provided for practitioners. The influence of informed professional opinion on practice patterns tended to be particularly important, although financial and legal sanctions were available if required. The overall process resulted in a considerable change in the assumptive world of influential professional opinion and illustrates the importance of linkages.

5. Similarities and differences between VET and healthcare

The similarities and differences between the sectors are considered firstly for managers in healthcare and VET provider institutions, and secondly at practitioner level. In each case, the similarities are considered first and then the differences between the sectors.

1. Institutional level decision-making

At this level there are certain *similarities* between healthcare and VET in the relationships between R&D and managerial decision-making. The *policy process* has similarities, although in both sectors there are variations between institutions, eg in size, complexity, institutional autonomy, and public or private ownership. In both sectors the environment is affected by wider considerations, such as the Hilmer reforms and the changing balance between consumers and providers. In both sectors R&D is undertaken to inform decision-making and external R&D is also used, but R&D is not the only input and not necessarily the most important. Decisions can be influenced by R&D directly, but often R&D is cumulative in its impact and combines with other factors to produce change.

The *power* of stakeholders is relevant in both VET and healthcare in determining whether R&D has influence on managerial decisions. If those with power are not aware of relevant R&D or do not attach much significance to it, then their decisions are unlikely to be influenced by R&D. Power can operate directly on managerial decision-making, especially in government institutions, which dominate both healthcare and VET, and also indirectly. Within the non-government sector, the power of key stakeholders can differ between commercial organisations and those run by religious and charitable groups.

The *assumptive worlds* of key stakeholders are also important for the relationships between R&D and decision-making in both healthcare and education. To the extent that key stakeholders are open to evidence and interested in R&D, it can have audience and thus influence decision-making by managers (and conversely). The evidence shows that in many healthcare and VET institutions, managers give audience to R&D and are open to its influence on their decision-making.

Secondly, there are similarities in terms of *R&D* between healthcare and VET. Provider institutions in both sectors undertake R&D, which tends to be applied in focus, closely linked to institutional policies and practice, and to the search for competitive advantage in increasingly contestable markets. Much of it is linked to the perceived needs of users. Thus, the R&D tends to have audience and some influence, but the distinction between researchers and decision-makers becomes blurred and the research's claims to objectivity can be affected. The R&D is often relatively specific to time and place, may be commercial-in-confidence in nature and is not widely disseminated. Generally, in both healthcare and VET, R&D for managerial decision-making in provider institutions contributes little to the accumulating body of knowledge. However, R&D can contribute new and better information, research skills, attitudes and educated people to decision-making processes and outcomes in both sectors.

Thirdly, the evidence shows that *linkages* between R&D and decision-making are important if R&D is to be used and have influence in either education or healthcare. The R&D tends to be more influential if the linkages occur throughout the study, rather than solely at its conclusion. And linkages established in one R&D project can result in collaboration which transcends the impact of the single study. In both sectors the linkages can be formal or informal, direct or indirect. People-level exchanges appear to be particularly important. Linkages with students (in VET) and patients (in healthcare) are significant, as well as with providers. And indirect linkages can occur through institutional councils, advisory groups and professional associations in both sectors. More generally for the relationships between R&D and managerial decision-making specifically at provider level, mutual esteem between researchers and decision-makers, collaborative approaches and a concern to improve the operation for key stakeholders as a whole appear to be important in both sectors.

There are also significant *differences* between VET and healthcare in the relationships between R&D and decision-making at the level of managers in provider institutions. First, in *decision-making* a higher priority appears to be attached to R&D in healthcare provider institutions, especially R&D on clinical matters, than in most education and training providers. The methodology tends to be more scientific and technological, the disciplines command more general respect in the institution, and decisions can be more acceptably based on the R&D evidence. The influence of research skills and attitudes tends to be stronger and the technology of production appears to command more unified support from the professionals in healthcare than in VET. Interestingly, as health promotion and prevention come to command greater support among healthcare professionals, the contrast with education and training may become less striking.

Secondly, there tends to be a stronger *research culture* in healthcare institutions, especially in teaching hospitals. This has an effect on the research skills and attitudes of the

institutional policy-makers and on their assumptive worlds. The strength of the clinical perspective carries over into the administrative processes of the institution to a degree which does not occur in most VET providers. Many clinical leaders are personally involved in healthcare administration at provider level; apply their research skills and attitudes to managerial decisions in the institution; and guard jealously the autonomy of their clinical activities.

Thirdly, at the departmental or unit level, where, in practice, much decision-making occurs in provider institutions, there are closer linkages between R&D, teaching and service activities, and management in healthcare than in VET. Since the linkages are stronger in healthcare, R&D tends to have a greater influence on decision-making.

Finally, the R&D pressure on decision-makers from outside the institution tends to be greater in healthcare than in VET. Provider institutions in both sectors are, of course, subject to external suggestions, pressure and advice on a continuing basis. But in healthcare the R&D base for it tends to be greater than in VET, mediated particularly through powerful *professional associations*. They are knowledgeable about the institution and closely linked to it, but not dependent on it. Typically they are keen to maintain and raise standards, including on the basis of research evidence.

2. Decision-making by practitioners

There are **similarities** in the relationships between R&D and decision-making when comparing healthcare and VET practitioners. The *framework* suggested in Section 2 applies at the level of practitioners. The decision-making system, the R&D system and the linkages between them are relevant to the relationships between research and action; but not in exactly the same way as at the other levels.

The decision-making *process* tends to be more integrated at the practitioner level, with less discrete stages than at the policy level. For example, there is less of a distinction between policy formulation, policy adoption and policy implementation. Also, whereas at policy level a decision once made may be difficult to reverse, at the practitioner level decision-making tends to be continuous. Thus, the timing of R&D findings is less critical for implementation at the practitioner level than at the policy or managerial levels (although not for the individual patient or student). On the other hand there are many more practitioners than policy-makers, so that targeting the relevant audience presents a greater challenge.

The distribution of *power* is important for the relationships between R&D and decision-making at practitioner level, as at the policy and managerial levels. Peer pressure and professional opinion are significant elements of power for practitioners. From one point of view practitioners are directly constrained by existing policies, inspection procedures and the like, and indirectly constrained by incentive structures, cultural expectations and established working arrangements. On the other hand, healthcare professionals, especially medical practitioners and teachers are recognised as undertaking valuable social functions and are accorded substantial autonomy to perform them. At a more general level, as social attitudes alter, so does the power which can legitimately be exercised by healthcare and education professionals in general, and individual practitioners in particular.

Practitioner decision-making is influenced by their *assumptive worlds*. The separate elements which affect the assumptive world of practitioners, such as initial disposition, the nature of the training program and the practice settings, tend to reinforce each other for a specific profession and to differentiate increasingly one group of professional practitioners from another, eg doctors from teachers, or surgeons from GPs. Each of the elements affects the assumptive worlds of practitioners and thus their decision-making, including the degree to which R&D has audience and influence.

The *R&D system* is important for decision-making in both healthcare and education. In both sectors R&D takes place in many settings, including by practitioners. While it contributes cumulatively to the individual's own practice, practitioner R&D contributes relatively little to the accumulating body of knowledge which is available to other practitioners (and researchers). It appears that, in both healthcare and VET: those who undertake R&D are also more likely to give audience to R&D undertaken elsewhere and be influenced by it; and the three attributes of R&D are each significant. Much of the R&D undertaken by practitioners is applied rather than theoretical. It tends to interact in its influence on practice with the entire array of beliefs, assumptions, interests and experiences of the practitioner. Its use tends to be instrumental, interactive, legitimative and perhaps conceptual rather than a weapon for explicit political or bureaucratic conflict.

Linkages between R&D and decision-making are important at the practitioner level in both VET and healthcare in affecting whether R&D has audience with decision-makers and influences their actions. When practitioners undertake R&D, its use is guaranteed and its influence on decision-making more likely. The developing insights are available to the practitioner throughout the R&D study and may influence decision-making outside the confines of the specific project. When practitioners undertake R&D themselves, they appear more likely to be aware of R&D undertaken elsewhere and for it to have influence on their practice. Professional associations, professional opinion and peer interactions are significant linkages for many practitioners in both education and healthcare. Joint research projects have also been shown to strengthen existing linkages between researchers and practitioners (and to assist in developing new linkages). Linkages can be indirect, since professionals are influenced by the wider society in their professional practice as in their private activities.

However, there are also **differences** between healthcare and VET in the relationships between R&D and decision-making at the practitioner level. First, it appears that R&D has a greater influence on decision-making by medical practitioners than by teachers. The difference is less marked between teachers and other healthcare practitioners. It may reflect the more scientific orientation of healthcare than education R&D, the greater community support for R&D in healthcare than in VET, and the higher prestige attaching to medical practitioners than teachers, resulting in greater autonomy for their practice. Secondly, the linkages between R&D, teaching and service provision tend to be closer in healthcare than in education. Thirdly, professional associations in healthcare, especially those for medical practitioners, are substantially more influential on practice than those in education; and they are significantly more influenced by R&D. Fourthly, healthcare practitioners, notably doctors, appear to be more sympathetic to research skills and attitudes, more open to evidence and more likely to consider it as a basis for possible changes in their practice than the generality of VET teachers; although most professionals

are open to new and better information, including from R&D, if it will facilitate better service to their clients.

6. Five concluding comments

First, the evidence is that R&D does have an impact on decision-making by policy-makers and practitioners in both healthcare and education, but not in the way many people think. For example, the research enterprise is accumulative. Over time, research's main contribution may be to the 'big ideas'. A number of the 'big ideas' preoccupying senior decision-makers in recent years are grounded in research. The outputs of the R&D system also include research skills and attitudes and trained personnel (human capital). These outputs are often overlooked (they were largely ignored by 'users' at the symposia). Their absence substantially weakens decision-making.

Secondly, it was generally not possible to evaluate in any quantitative fashion the *extent* of the influence of research on decision-making. There are many different types (broadly defined) of research and these can be used in a wide range of decision-making contexts. They have varying levels of visibility to the separate groups of users and other stakeholders and affect their knowledge of the extent of research's influence. Thus, a priori, one cannot conclude which types of research are used and have influence more than others: it depends. Further, the extent of the use or influence of research cannot be determined by considering the research system alone. It depends critically on the circumstances of decision-making in a particular context and the linkages between research and decision-making in that context. The research studies demonstrated that there are many contexts and a range of (potential) uses of research in decision-making.

Thirdly, the extent to which research is used and has influence on decision-making can be *enhanced* by the actions of the stakeholders. This places responsibilities on both decision-makers and researchers. For example, decision-makers have an obligation to be engaged with the world of ideas and to develop their own human capital. They cannot expect to make good decisions without thought. Neither decision-makers nor researchers are likely to act appropriately unless the incentive structures in their work settings encourage it. Also, to the extent that a significant amount of research is now commissioned by users in both healthcare and VET, these groups' actions will influence the quality of research. For example, a strong preference by users for R&D that is short-term and instrumental can, in the longer term, weaken the research base. A weak network of effective linkages undermines the potential for research to be used in decision-making at each level and to have influence, by limiting the potential for the two-way flow of information and people. The emphasis on linkages rather than dissemination (narrowly defined) increases the mutual responsibilities of the parties.

Fourthly, the case studies brought students and workers (in VET) and patients and carers (in healthcare) into prominence as an additional set of significant decision-makers by whom R&D can be used, and on whom it can have an influence. This was a valuable addition to the framework for analysing the relationships between R&D and decision-making. It emphasises that decision-making at this level is often the result of the *relationship* between providers and users; and that R&D can be used by, and have influence with, both parties to the relationship.

Finally, the studies raised the difficult issue of the precise boundaries of R&D, especially in relation to research skills and attitudes, and at the level of practitioners and managers. An openness to evidence in making decisions, for example, can be characterised as a way of working, as well as characteristic of R&D. A number of the case studies can be seen as wrestling with how best to define the precise boundary of R&D activity. In an increasingly turbulent environment, an interest by managers and practitioners in evidence, an openness to new perspectives and a willingness to learn progressively and systematically from the experience of oneself and others is central to improving practice and performance. The studies illustrate the diverse ways in which a beneficial relationship between R&D and decision-making in healthcare or education at the managerial and practitioner levels can operate, or be frustrated.

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