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Trends in science communication today:
bridging the gap between theory and practice

How Managers Seek and Use Information

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Abstract

How modern organisations seek and use knowledge is rapidly evolving. Information technologies, including databases, new telecommunications, and software for synthesizing information, make a vast array of information available to public and private organisational and their stakeholders.

As organisations continually change – from new corporate goals, staff turnover, organisational restructures, different strategic alliances and networks, and social pressures – the way that individuals seek information for their decision making needs has become a critical issue for scientists.

Mangers face a daunting task in today's information environment. They must make intelligent judgements based on a welter of facts, opinions, forecasts, gossip and intuition. On the one hand they receive too much information, while on the other hand, they don't get enough of the right information. The central problem for management is condensing a wealth of information from social, political, economic and scientific sources, in a way to obtain an accurate picture of an issue.

This presentation will outline how scientists can better understand the information seeking behaviour of professionals. It will show how traditional methods to communicate scientific information to managers in large organisations often fail. Many information products, technologies and systems fail because they do not consider the needs of the users. Effective communication of information - to inspire action that positively changes public policy, industry practices or community behaviour - depends on well established organisational partnerships, extensive personal networks and the active involvement of managers in the information seeking process.

"It's not the message itself, but what the audience does with the message, that counts."

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How Managers Seek and Use Information

Introduction

"In an information economy, organisations compete on the basis of their ability to acquire, manipulate and use information effectively." (McGee and Prusak, 1993).

With continual changes to public and private organisations as a result of new corporate goals, staff turnover, organisational restructures, and the expansion of strategic alliances and networks, individual information seeking has become a critical issue for scientists.

Not too long ago, information in organisations was the exclusive preserve of management, whether through specialisation, organisational design or leadership style. Supervisors provided authoritative directives concerning organisational activities. Managers were encouraged to think of a one-way, top-down flow of communication. Traditional media, mainly written, were usually passed down to passive recipients. Staff and public stakeholder groups were given information, which discouraged information 'seeking'.

Such one-way information systems fail because their recommended benefits are not apparent to staff or stakeholder groups, and they do not identify or segment various interest groups within the total audience who want information provided in different ways.

Today, staff at all levels must make decisions about what goals should be emphasised and how they should be accomplished. Organisations are becoming more accountable to their stakeholders and client groups, and their decision making processes are becoming more transparent to the community. Individuals have free access to a bewildering wealth of information. There are literally millions of articles published every year in organisational, popular and technical literature making it nearly impossible for even the most dedicated individual to keep abreast of recent advances in knowledge about public policy or industry practices.

How individual in scientific organizations, government agencies and industry sectors seek and use information is rapidly evolving. Information technologies, including databases,

data mining, new telecommunication systems, and software for synthesising information, make a vast array of information available to an ever-expanding number of organisational members. These trends now put responsibility on people to become active seekers, rather than passive recipients of information, especially for decision support and problem

solving.

'Information seeking' is the difference between taking action or not. It is the first stage in changing individual or organisational behaviour. It can provide individuals with feelings of control. It reduces people's uncertainty and increases their commitment. It helps shapes attitudes and is the basis of most actions.

"The dilemma is clear: on one hand, managers receive too much information, while on the other hand, they don't get enough of the right information".
(Katzer and Fletcher, 1992.)

Managers face a daunting task in today's information environment. They must make intelligent judgements based on a wealth of facts, options, forecasts, gossip and intuition. Their decisions are being challenged and modified by many different community, business and political groups. Even coming to grips with the facts is a minefield of ambiguity and uncertainty. Managers continually ask themselves: how do we work out what we need to know? And then question: how do we find out?
They then face a continual problem in condensing a wealth of information, including scientific data and reports, in such a way as to obtain an accurate picture of an issue or problem. Scientists often need to help managers frame their questions, such as 'what do you need to know for your day to day operations… for longer term planning… for new technologies and approaches… for emerging issues?'

People build and maintain relationships, organizations don't. Even if there is a formal alliance between organisations, it is the quality of relationships between board members, project managers, researchers and administrative staff that determines the effectiveness of the alliance. So scientists need to establish more direct communication links with managers. To be effective communicators, scientists must understand the mind-set of managers. Scientific information must not only be relevant to the managers, it must be presented in ways individuals or groups prefer and feel comfortable with. "Communication is a journey, not a single, simple event. Communication is the process of gradually achieving a sense of being on common ground with another person. Communication is the slow – often difficult, sometimes painful – process of sharing ideas, thoughts, information with another person: sometimes stimulating them to contribute and sometimes asking them to respond." (Mackay, 1994).

The issue is how to achieve fast, concise, highly relevant exchange of knowledge between scientists, managers and other key stakeholder groups for effective outcomes.

Scientists and communication

Scientists who want their information considered and applied by managers must first understand how communication actually works. "The basic error is to confuse the physiology of seeing and hearing with the psychology of responding… it's not what our message does to the listener, but what the listener does with our message that determines our success as communicators." (Mackay, 1994).

One practical way scientists can influence managers is by developing relationships with key individuals in organisations they wish to influence. The better we know someone, the easier it is to communicate. All other media, from the telephone, to technical reports and computer networks, are mere approximations for what happens when, face to face and over time, we get to know each other and use information for action.

Scientists often ask why managers don't listen to them. They may not listen because the medium may be incompatible with the message they try to send, or inappropriate to the circumstances. The message may be too technical or provided in the wrong medium to suit the management group. The message will often be interpreted in the light of how, when, where and by whom it is given. In many organisations, for example, employees learn to ignore the vast number of written messages which reach them, or drown in the number of email messages being sent. The print medium is often perceived as being inappropriate (too impersonal, too routine and too many) so the messages themselves, and calls for action, are virtually ignored.

A survey of Australian employees (Larkin 1994) found that, overwhelmingly, staff prefer to receive information in the context of a person-to-person discussion. Videos, company newsletters and other forms of communication were generally dismissed: Larkin found that fewer than 10 percent of Australian employees expressed satisfaction with information received through company newsletters.

So scientists should understand that many information technologies and traditional information systems fail because they do not consider the needs of managers and other user or interest groups.
For example, electronic information repositories such as websites are usually developed by producers of information rather than users of information, so they are often not client focussed. Another hazard from increasingly sophisticated communications technology is that, as we become more dependant on machines sending and receiving information, we may dramatically increase our capacity to receive messages while, correspondingly, reducing our capacity to interpret them.

Information seeking behaviour of professionals

Understanding the information seeking behaviour of managers cuts across many disciplines: decision-making in organizations, sociology, information sciences, library sciences, psychology, computer sciences, marketing and consumer behaviour. While scientists are well trained in seeking information and knowledge, many fall short in providing information and knowledge effectively to managers.

To make matters more difficult, understanding how managers seek information is complex and there are many barriers. Managers are continually faced with four fundamental problems:

- they have more choices and sources;
- they have more stakeholder pressures
- they have more sources of information about these choices; and
- more information is targeted at influencing their behaviour.

In his book *Information Seeking: An Organisational Dilemma*, Johnson shares some insights about how to engage managers that may surprise scientists who still rely on using the conventional publication approach.

1. People seek information from easily accessible sources. They usually go to supervisors and colleagues, rather than to unknown credible or authoritative sources. People will knowingly seek out inferior information from an accessible source rather than spend time and effort searching for more facts or going to a library.

2. "People are often unaware of information sources and how to use them" (cited in Doctor, 1992). They tend to go back to past sources, even if the information they get is not as useful. Paradoxically, the more they know about a particular topic, the less likely they actively search new knowledge about that topic.

3. People follow habitual patterns in their information seeking. They fall into a pattern of information seeking on particular topics, especially with other people. Unfortunately, most people have poor information seeking habits, and there is considerable inertia that must be overcome in changing their behaviour. For example, in medical or health information the first source people consult is a family member or friend.

4. Face to face interpersonal communication is *the* preferred mode of communication for information seeking. As already mentioned, it is flexible, relevant, has a variety of rewards, and is timely – compared to other means. People turn to other people they know and trust for information, usually from inside rather than outside their organisation.

5. Different people use different sources of information depending on their skills and experience. More experienced, educated and knowledgeable people have a wider range of information sources and networks both inside and outside of their organisation.

6. Information seeking is an active, energy using process by individuals to meet a perceived need. This is a possible precursor to deep learning where the person understands the material and can use it in other settings.

Cooperative Research Centres

Modern research and development organisations are now creating horizontal, action-oriented structures and partnerships with many public and private organisations. Australia's Cooperative Research Centres (CRC) Program is one such program.

The CRC Program is funded by the Australian Commonwealth Government in conjunction with a variety of universities, public agencies and industries. The Program currently supports more than 60 CRCs from industry sectors including manufacturing, mining, energy, agriculture, medicine, communications and the environment. CRCs cover long-term, collaborative research and development efforts of very substantial quality and size that contribute to national objectives.

The national CRC Program emphasises the importance of developing internationally competitive industry sectors. It also addresses the health and well being of Australian society, the understanding and management of the environment, and the interaction of all these objectives to achieve ecologically sustainable development.

CRCs are joint venture networks between universities, government agencies, research organisations and industry that have a common goal. They are jointly funded and managed in a corporate system with a governing board. Their goals are to keep pace with rapid scientific and technological progress; to make Australian industry sectors more internationally competitive; to enhance environment management capabilities; to capture the benefits of research in commercial and public policy applications; and to stimulate graduate education and industry training programs.

In this new type of organisation, a principle function of management is to facilitate the flow of information and invest in ways that enhance networking of staff, information systems and relationships. Many CRCs work with their industry members to help them define their knowledge needs, which may lead to the development of their own knowledge strategy.

The CRC for Coastal Zone, Estuary and Waterway Management, which exists to improve the health of Australia's coastal waterways, has developed a distinctive research theme known as citizen science and education. The aim is to develop theoretical frameworks, practical tools and education activities to integrate social and economic understanding into the goal of the CRC, which is to bridge the gaps between science and decision making, policy and planning.

Citizen science is a participatory process including all sectors of society—the general public, government and industry—in the development and conduct of public-interest research to bridge the gaps between science and the community, and between scientific research and policy, decision making and planning. Bridging these gaps involves a process of social learning through sound research, full public participation, the adoption of adaptive management practices and the development of the democratic values, skills and institutions necessary for an active society.

Achieving this goal requires relevant information to be integrated within appropriate toolkits and frameworks and disseminated in ways that suit the needs of planners, resource managers and users, private developers, consultants, students, the general public and community organisations. This will involve understanding social, economic and political influences on the capacity to participate; strategies for enhanced communication and public participation; a toolbox of citizen science approaches; and training in the use of these tools and approaches for community members, government and industry personnel, as well as researchers, postgraduate students and other stakeholders.

A 10 point plan for success

There are a number of ways that scientists can facilitate and encourage active information seeking by managers and stakeholders. It can take years of developing one's abilities and contacts but it is absolutely central to the role and responsibility of a good scientist. The following ten suggestions will help scientists and information providing organisations get started:

1. Develop an interactive communication plan for each project in conjunction with relevant managers. The

plan should be part of the research phase, outputs and outcomes. It should identify stakeholders, clients and beneficiaries, and understand their concerns. It should outline communication strategies, set clear objectives and choose suitable tactics. The planning process should design clear messages, and include evaluation and an appropriate level of resources.

2. Always provide results in plain language and relate new information to the wider realms of science and human affairs. Go for the big picture! Show how it fits into people's lives - their health, wealth or well-being. This helps people see how new information can benefit their work. People often make far reaching decisions based on executive summaries, staff briefings and media releases.

3. Provide training programs to help managers understand and use new sources of information such as internet search programs, conceptual models, computer simulation software or decision support systems. Workshops and meetings can also be used as 'reality checks' to customise more useful information tools for managers and community stakeholder groups.

4. Utilise specialist scientific advisors to provide technical assistance and information support services on critical issues or problems that an organisation must address. Independent specialists can help facilitate and synthesis diverse information and provide frameworks to address management issues.

5. Employ knowledge brokers and locate them in key management organisations to act as 'agents of change' on behalf of scientific providers. Knowledge brokers, with strong scientific and communication skills, can often bridge the gap more effectively between scientists, planners and policy makers from the inside, than scientists can by working from the outside.

6. Introduce people to new information sources and ideas, such as multi-disciplinary teams outside their organisation, independent experts and new resources. Encourage open access and sharing of skills and information between organisations and programs. Invite managers to join project teams in the search for knowledge.

7. Form an advocacy group, foundation or professional network for the organisation. These associations serve as important lobbyists for the provision of information to organisations. They often seek more money for research that leads to information for databases, special events or other information infrastructure.

8. Support group decision making processes by using conceptual models to facilitate the process of making a decision and providing the group with ready access to relevant data and data manipulation systems. Software can be designed to systematically take members through each stage of the decision process, ensuring for example, that multiple objectives are integrated and evaluated. Once alternatives are assessed, they also permit various transparent methods of reaching a decision.

9. Apply the 10 percent rule. That is, allocate at least 10 percent of all research funding to targeted communication activities and products, such as stakeholder workshops, public meetings, media publicity, information products, video documentaries, interpretive booklets, training courses, manuals or websites.

10. Foster the use of scientific information with many prospective client groups, such as community action groups, professional associations, community service clubs, recreational groups and educational organisations. Make information easy to access. These groups can influence local councils, government agencies and industry groups. Knowledge providers need to more actively promote the benefits of innovation, research and development to the public.

But a final warning about information technology. The next wave of computers may quickly overtake human capabilities to simulate complex models, including more variables than humans are capable of considering, and come up with scenarios of various degrees of plausibility. These systems will not, however, be able to make policy or ethical decisions relating to issues facing societies.

Computer-based information and decision systems excel at programmed tasks. They do not perform well, and may even be dangerous, for tasks that are ambiguous or that need creativity and judgement. (Keen and Morton, 1978).

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