Managing information to serve the information user

Professor Thomas D. Wilson, University of Sheffield

Introduction

I should like to begin by thanking UKeiG for presenting me with the 2020 Jason Farradane Award*, and those colleagues who nominated me, particularly David Allen and David Streatfield, who organised the nomination.

The Award gives me particular pleasure as I actually knew Jason Farradane. I met him at conferences in the 1960s and corresponded with him about his relational indexing system, as indexing and information retrieval were part of my teaching load at the time. I recall that he was surprised, on our first meeting, to learn that a library school actually taught indexing. I suspect that he would also be astonished to learn that I was to receive this Award named after him. However, I'm accepting this award not for myself, but for my colleagues who have worked with me to make Information Research one of the key journals in the field, and who share my belief in the genuine, Platinum Open Access model.

There is no question that Farradane had a hugely significant influence on the invention and development of information science, and his foundation of the courses at City University had a major impact on the development of education for information science. If one makes progress by 'standing on the shoulders of giants', I am honoured and happy to be standing on Jason Farradane's shoulders - I would not claim to have seen further, but I can see how the landscape has changed.

In thinking about how to approach this talk, that notion of the changing landscape acted as a prompt. I have seen many changes in the information landscape over the years I've been active and, as the landscape changes one's image of the landscape changes, and one finds new ways of exploring it. Indeed, as new features arise in the landscape it is *necessary* to find new ways. Just as almost everything in the information landscape has changed over the past fifty years or more, so the role of the information manager has changed and continues to change. People also change in their search for and use of information, mostly as a result of changing information and communication technologies. As a result we need to change our image of their behaviour.

The changing face of information management

Information management has changed significantly over the years since the term was first invented; indeed, the concept has changed completely. Originally, it arose in relation to controlling the amount of paper that the US Government and its contractors had to produce. The Government in defining what it wanted and the contractors in setting out what they intended to do and how they intended to do it. The term was used, along with the related *information resource management*, by the National Commission on Federal Paperwork, in 1977, where paperwork included all forms of electronic documents as well as printed documentation. The load was significant, for example, the State of Maryland turned down a $60,000 ($204,000 today) grant because the cost of completing all the necessary forms would have cost them about $45,000 ($153,000); and an oil company spent $17 million ($58 million) to complete and submit government reports (excluding their tax returns) and employed 475 staff to do this. I also recall reading that the documentation for the maintenance of a nuclear submarine was so huge, it was impossible to carry it on board, until the arrival of the laptop and the compact disc.

The early era

If we look back in time to the era before the impact of computers on information management (and I may be the only one present old enough to remember that time!), we would see quite a close relationship between the information provider and the information user. For example, public libraries were organised on a combination of a thematic structure and an age-related structure. The latter evident in the adult library and the children's library, and, possibly, a young adult library. Thematically, the larger city libraries had a

lending library and a reference library, and often, a local studies library and a business library. There were also divisions by material: record and subsequently CD and DVD collections, printed music collections, collections of plays for amateur dramatics groups, and so on. Public libraries also provided patients' libraries in hospitals, and libraries in prisons. In other words, the structure of the organisation reflected the potential needs of the users, and the information seeker would go to the appropriate part of the library, depending upon their needs and interests. To some degree these structures persist into the present day, in spite of the changes that have taken place that enable access to digital resources, and in spite of [past Chancellor of the Exchequer] George Osborne's austerity attack on our public services.

In the world of so-called special libraries in business, industry, government and so on, the links between information management and information seeker were close: librarians and information officers (as they were often called) carried out literature searches for managers and researchers, they produced selective dissemination of information products and distributed these to users, listing, for example relevant items from the journals received, or copying contents lists of journals and circulating these.

I worked in the nuclear industry for a few years and the researchers would frequently mention the support received from the library in the reports they prepared. On one occasion a researcher burst into my office, his hands and a bit of his face covered in graphite dust, urging me to come and see what he had manufactured - perfectly spherical balls of graphite, about the size of ball bearings, which he had been able to produce as a result of information I had found for him. As what would now be called an information manager, I had been urged by my boss, Dr. Monty Finniston (later, Sir Monty, CEO of British Steel) to spend a third of my time out in the laboratories talking to people, finding out what they were doing. So that is what I did - and it paid off in terms of my understanding of what was going on, and also in terms of occasionally saving the company money. On one occasion I discovered that the fluid flow lab was carrying out experiments that related to work going on in the electronics lab on the same problem, so I mentioned this to both parties and they collaborated on a project that ultimately cost less than their independent efforts.

This close interaction with the scientists and engineers in the organisation also benefited the information service as they began to trust me to find information for them, since (in spite of having only six O Levels) I was able to ask reasonably intelligent questions to identify their information needs. Someone from the metallurgy department came in one day and asked for an 'encyclopaedia of metallurgy', and the conversation went like this:

> *'Why do you need an encyclopaedia?'*
> *'I want to find something about uranium.'*
> *'Uranium 235 or uranium 238?'*

'Uranium 238.'
'And what do you want to know about uranium 238?'
'Its conductivity.'
'Thermal conductivity or electrical conductivity?'
'Electrical.'
'OK – let's take a look at the United Kingdom Atomic Energy Authority's (UKAEA)
handbook on the properties of Uranium 238 - that should have what you need.'

Talking with him later, it emerged that he was not a metallurgist, but a nurse, who was on some training secondment to find out about work in industry. However, the incident illustrated the common phenomenon of people stating their information needs in a general way rather than immediately stating their specific need. Which still happens today: people continue to pose their questions to search engines in general terms, using only two or three terms in a query (Jansen *et al.*, 2000).

The present situation

That whole scenario is now a long time ago - sixty-two years, to be precise, and, of course the whole field of information management has changed out of all recognition. All those years ago I implemented one of the earliest optical coincidence card systems to index the UKAEA reports we received: who remembers those systems now? At the time, computers were just beginning to make some kind of impact on information retrieval, mainly in major organisations in the USA, and I went along to the head of Computer Services and asked him about using the computer for indexing. I think it was an early Pegasus machine with a minuscule memory, much less than my mobile phone. He came to the library, I demonstrated the system I'd developed and he said, 'No, we couldn't do anything better than that.'

Managing information, then, to serve the needs of the information user was very much a matter of interpersonal interaction: nothing stood between the provider and the user. Regular conversations with users enabled the information manager to select resources, organise them, and disseminate them in such a way as to satisfy the information needs that emerged.

We've come a long way from the pre-computer age and I suspect that the connections between information provider and information user are no longer as close and personal as then. I wonder if any senior manager would now urge the information manager to spend a third of his or her time walking around the organisation. I would guess that the work pressures in modern business are much too high, in most places, to allow such freedom. The computer, the IT network, the Internet and the World Wide Web have put distance between provider and user and, to use the jargon of the day, the system has become 'disintermediated'. This happened very quickly: the Health and Safety Executive's offices

were in Sheffield, a short walk from my Department, and the information manager, Sheila Pantry - whom some of you may have known, was an occasional lecturer for us. She introduced one of the earliest online catalogues on their newly installed internal network (well before the Internet) and the immediate effect was that almost no one visited the library any longer. They simply sent a message asking for a book or a photocopy of a journal article to be sent to them - the system, rather than the person, became the 'intermediary'.

The link between information resources, in our understanding of the term, and information technology is now tighter than ever before. The vast majority of information is now produced in digital form, transferred in digital form, accessed digitally, and often remotely, by the user. We share documents not by mail, but by e-mail, or, in organisations, by shared use of centralised office automation systems. Even that term now seems rather dated, since automation is really the wrong word; humans are still involved in what we might call the final processing of the data or information, which is managed through the systems, and the systems themselves pervade just about every aspect of the organisation's activities, rather than just the office.

Although the technology has a kind of centralising influence on information generation and use, as a result of centralised storage of data and information, and the use of common programs for production, retrieval and access, there has also been a simultaneous *disorganisation* of information flowing through the organisation, as a result of the use of e-mail, mobile phones, and social media. At the same time a culture of overwork has developed with people being on-call at almost any time, and with working outside of office hours becoming the norm, in some organisations.

And work overload has led to information overload. I think it is important to be aware of this relationship: I did work on information overload for Accenture some years ago, and it was clear in all the organisations we looked at, that information overload was a consequence of work overload (Wilson, 2001; Allen and Wilson, 2003). People went to extraordinary lengths to try to cope with the problem: for example, one person we spoke to in a major bank took her holidays in places like Nepal and Peru, because there was no mobile phone signal. Otherwise, she was certain that her holiday would have been interrupted by calls from the company to deal with problems.

Almost none of the companies at the time had any e-mail policy, so there was no guidance on best practice in the use of e-mail. For example, people complained of others who used 'Reply to all', instead of replying only to the sender, thereby generating unnecessary messages in everyone's inbox, which had to be read just in case the content was relevant for them. Since then there has been increased awareness that e-mail can generate information overload and when I put 'e-mail policy' into Google, I get 165,000 items, including many references to the specific policies of organisations.

Where are we now?

So where are we now? What aspects of human information behaviour are significant for the effective management of information to meet the needs of the information seeker? Perhaps a useful starting point is to understand, as Alfred Schutz has noted:

> *'the knowledge of the man who acts and thinks within the world of his daily life is not homogeneous; it is (1) incoherent, (2) only partially clear, and (3) not at all free from contradictions'* (Schutz, 1964, p. 93). [Why does this bring Boris Johnson to mind?!]

This presents us with a definition of the role of information management in the organisation: it is to help the person to achieve coherence, clarity, and lack of contradiction in their understanding of the daily problems and issues that arise in the course of their work. Easily said, but not so easily done. If we start from here, however, it is clear that we need a better understanding of the situation of the people that information systems are designed to serve.

To begin with, the influence of *time* seems to be even stronger today than fifty years ago. Many businesses and public sector organisations now employ fewer people than are actually needed and the time pressures on people are significantly greater. This suggests that the *principal of least effort* will apply even more strongly: people will want systems that deliver answers quickly. If you share an office with someone, or work in an open plan office or laboratory, the quickest way to get an answer is still to ask someone. Perhaps, voice interaction with systems will become the norm and machine learning may ultimately lead to alerting systems that analyse and summarise the day's output of information relevant to a given individual.

If such systems do emerge (and even now they may exist in experimental form in Google's laboratories) they will need to heed another fact of organisational life that we noted years ago as a result of the Information Needs in Local Authority Social Services Departments (INISS) project: that work is *highly fragmented*. In the case of the INISS organisations we observed that a manager could filter mail in the morning, routing it to other members of staff, or setting aside to be answered later, be interrupted in doing so by telephone calls or someone knocking on his door, and then having to go to a meeting (for which he had read the papers at home the night before); during the meeting he participated in discussion and found himself assigned to yet another working party, returning to the office he found a crisis situation in progress, in which a woman had threatened to throw a child out of the bedroom window if her husband did not return – both husband and wife were described as 'educationally challenged'. And so on through the day. We concluded that there was a three-minute rule: the vast majority of communication events in the workers' daily lives lasted three minutes or less. That is the time within which the person's attention must be captured if they are to follow up information, e.g., by reading a journal article, or an internal

report; which, in this case, was usually done outside of working hours, because of that fragmentation of the day.

The art of summarising information in such a way as to catch the attention of the reader becomes a critical information management skill in situations such as this, and, in developing alerting services based on user profiles, that three-minute rule needs to be borne in mind.

A person's personality is another factor. Heinström's (2002) *fast surfers, broad scanners, and deep divers,* are related to personality types: the fast surfers were associated with *extraversion*; the broad scanners with *openness to experience*; and the deep divers with *conscientiousness*. However, regardless of personality type and search style, everyone has to use the same system; no way has been found, as far as I am aware, of designing systems that can respond to search style. Perhaps new systems, based on machine learning, may offer that possibility in the future, if indicators of style can be identified. Given that RankBrain (a machine learning algorithm) is already part of Google search, that possibility cannot be far ahead.

Just as personality is somewhat unchanging, it seems that the tendency to ask general questions rather than making a statement of a specific need continues. I don't think any system exists at present that could ask the kind of questions of a user that I asked of the fellow from the metallurgy department. And yet that kind of questioning used to go on all the time, not only in special libraries, but also in the reference departments of public libraries and the information desks of academic libraries. Everyone in the old library schools was taught about the importance of the 'reference interview', but there is no sign of the function being embedded in search systems. It is left to the information manager, then, to run information literacy programmes within the organisation, to teach the system users how best to interrogate them. In doing so however, they might eventually do themselves out of a job, as happened to one of our students.

The fact that we need to teach information users the effective use of systems illustrates the fact that everyone is now an information manager. There's even a field of research called *personal information management.* Increasingly, then, the responsibility for the effective use of information is on the information user. The information manager cannot be there for everyone all the time, other than virtually through the systems, by organising help desks, online information enquiry, and other means.

Dealing with information overload is a personal information management problem, although if the information manager is involved in helping to develop an information strategy in the organisation he or she can promote an e-mail policy as part of that strategy

and can be a voice in urging that mobile phones should not be used outside of working hours.

Conclusion

I'm well aware that I have raised more questions than I have provided answers to the problems of serving the information user through effective information management. One of the difficulties is that technology is constantly bringing about changes, most of which we do not anticipate, and which may be quite rapidly diffused throughout organisations. The policies that served just twenty years ago are no longer relevant, given the way that information is now delivered and exchanged. We have no idea what the future will bring, in terms of technological change. We know how things are trending; for example, the increased use by organisations of cloud services maintained by third parties, and the potential of machine learning and artificial intelligence. When these are put together we can imagine the distance between information manager and information user becoming even greater, when systems operated by global companies become the intermediary and when human to human interaction disappears from the landscape.

*The Jason Farradane Award was not presented in 2021 and 2022, and the call for 2023 nominations will be issued in late June.

References

Allen, D.K., & Wilson, T.D. (2003). Information overload: context and causes. *New Review of Information Behaviour Research*, 4 (1), 31-44

Commission on Federal Paperwork. (1977). Information resources management. Washington, DC: US Government Printing Office

Jansen, B.J., Spink, A., & Saracevic, T. (2000) Real life, real users, and real needs: a study and analysis of user queries on the web. *Information Processing and Management* 36 (2), 207-227

Schutz, A. (1964). The stranger: an essay in social psychology. In *Collected papers. Vol. II. Studies in social theory.* The Hague: Martinus Nijhoff

Wilson, T.D. (2001). Information overload: implications for health-care services. *Health Informatics Journal*, 7 (2), 112-117