### **Adoption of Online Databases in Public Libraries:**

## **An Australian Case Study**

By

Kirsty Williamson, Director, Information and Telecommunications Needs Research, School of Information Management and Systems, Monash University and School of Information Studies, Charles Sturt University, PO Box 197, Caulfield East, Vic, 3145, Australia

Email: kirsty.williamson@sims.monash.edu.au

Steven Wright, Research Fellow, Information and Telecommunications Needs Research, School of Information Management and Systems, Monash University, PO Box 197, Caulfield East, Vic, 3145, Australia

Email: steven.wright@sims.monaahs.edu.au

Frada Burstein, Associate Professor, School of Information Management and Systems, Monash University, PO Box 197, Caulfield East, Vic, 3145, Australia

Email: frada.burstein@sims.monash.edu.au

Don.Schauder, Professor and Chair, Information and Telecommunications Needs Research, School of Information Management and Systems, Monash University, PO Box 197, Caulfield East, Vic, 3145, Australia Email: don.schauder@sims.monash.edu.au

Abstract: The project on which this article is based set out to evaluate —using an interpretivist/ constructivist framework—the content, usability, and use of the four online databases that were introduced into Victorian public libraries under the Gulliver Program. The grounded nature of the method enabled the discovery of key issues that were not always related to the quality of the databases themselves. Since Everett Rogers' famous analysis of the diffusion of innovations appeared to have explanatory value in this context, his theory was used to illuminate the findings. This was despite the fact that an individual was not involved in this case but rather the State Library of Victoria making a decision to adopt an innovation on behalf of the public libraries of Victoria. The researchers believed that Rogers' framework could be used to shed light on why both staff and library patrons were slow in accepting or adopting online databases for their information seeking. The conclusion is that training is the principal way in which this situation could be changed.

Librarians and information professionals are involved in diffusion activity . . . . The concepts of diffusion, change agency, and critical mass provide . . . . a structure and criteria to analyse how effective [librarians] are, and reasons why some projects succeed and others fail. (Holland 1997, p.394)

Librarians are playing a key role in the diffusion of new online technologies, not just in public library settings. As Holland says, it is through persuading patrons to adopt information/networked technology that librarians act as change agents in the wider diffusion process. Within all library sectors, there is an "increasing emphasis on networked access to information resources, within the broader context of the emerging virtual library" (Martin 2001, p.1). It is through libraries that many people use technologies such as CD-ROMs, online databases, or the Internet for the first time. The

attitudes of librarians regarding new technologies are, therefore, very important. For example, in the early stages of the introduction of a set of online databases at a public library, the extent to which librarians understand and promote the databases will be crucial to their acceptance by library patrons. The degree of assistance provided to patrons will also be important at this stage. Australia is in a similar position to the United Kingdom where, according to Eve and Brophy (2000, p.2), "In order to support the demand for continued investment, libraries will have to be able to prove that ICT [information and communication technology] services are valued by the public and that the impact of these services justifies the cost." It is, therefore, important to understand the extent to which both librarians and library users are adopting the new technologies as well as the barriers to adoption.

In 2000, the authors embarked on a project, reported in this article, that set out to evaluate the content, usability, and use of four online databases —World Magazine Bank (Ebsco Host); two Gale products, Health Reference Library (now Health and Wellness Resources Center) and Custom Database; and Electric Library (at that stage an Infosentials

product). These four online databases were placed on a trial basis in the public libraries of Victoria by the State Library of Victoria (SLV) under the auspices of the Gulliver Program (Whitehead and Toohey 2001), so termed because of the opportunities for exploration and discovery the databases offered. There were two groups of participants in the project—staff and patrons—both of which provided interesting and rich data. Although an important focus of the project was the evaluation of the databases

themselves from a user perspective, the use of the interpretivist/constructivist framework (discussed below) enabled unexpected key issues to emerge. These turned out not to concern the standard and performance of the databases themselves but, rather, a less than optimal use of the databases for other reasons. With hindsight, the project became an examination of characteristics of online databases that were encouraging adoption as well as perceived barriers to use. Because Everett Rogers' famous analysis of the diffusion of innovations appeared to have explanatory value in this context, his theory was used to illuminate the findings.

### **Conceptual Framework and Method**

The two strands to the conceptual framework were the interpretivist/constructivist component, underpinning the method used, and "the diffusion of innovations" theory of Rogers (1995). These are discussed below, with the method being presented as part of the discussion of the interpretivist framework.

# The interpretivist/constructivist framework

This was an interpretivist study, which was concerned with understanding the meanings of the various participants within the context in which the online databases were placed. Interpretivist research is based on the idea that "there is no unique 'real world' that pre-exists and is independent of human mental activity and human symbolic language" (Bruner, 1986, p.95; cited by Schwandt, 1998). Knowledge and truth are, therefore, created rather than discovered, and there are often multiple, conflicting constructions of reality. Rather than attempting to ascertain general laws by which humans are said to exist, interpretivist researchers are more concerned with focusing on the "processes by

which meanings are created, negotiated, sustained, and modified within a specific human context" (p.225). The contructivist paradigm comes under the interpretivist umbrella and is widely used in social sciences research. In the information and communications fields, Brenda Dervin has received extensive recognition for her use of a constructivist approach that she calls "sense making" (Dervin 1992; Dervin and Nilan 1986). According to Dervin and Nilan, by 1986 there had developed an alternative paradigm to the "systems-centred" approach of the past. This alternative

posits information as something constructed by human beings. It sees users as beings who are constantly constructing, as beings who are free (within system constraints) to create from systems and situations whatever they choose . . . . It focuses on understanding information use in particular situations . . . . It focuses on the user. (p.16)

In contrast to the positivist approach to research, where the initial question can effectively limit what can be learned from a process of enquiry, an interpretivist/constructivist framework allows the participants in the research to exert a considerable influence on the important questions and findings.

#### From framework to method

In the case of the project discussed in this paper, the views or perceptions of the key users were sought. They included not only librarians in various roles but also library patrons. The researchers attempted to relate as closely as possible to individuals' experiences in the context of a particular setting—the public library. This was done through the collection of qualitative data in four Victorian Public Library Services in the first half of 2000. Two of the library services are in metropolitan areas (Bayside and Port Phillip), one is a regional library service (Corangamite), and one is in a semi-rural area (Casey-Cardinia).

The research in each case began with a focus group of six-eight library staff in order to explore their perceptions of content and usability of each of two databases as well as general access issues. A representative of SLV was included in each of the focus groups. These representatives were from VISioN, a Department of the State Library that answers reference queries from the Victorian public library service. Attempts were made to include library staff working in various roles in each of the focus groups, e.g., a library manager and a library technician.

Although it would have been useful for librarians to compare the four databases offered through the Gulliver program, for practical reasons it was necessary to allocate two of the four online databases to each of the library services. This was because it would have been too time consuming for each librarian to test all four and impossible to discuss them adequately in a hundred-minute focus group session. The setting of "homework," requiring staff to follow a topic of their choice in their two databases and to answer questions related to content and usability prior to their involvement in their focus group, resulted in data of high quality from these focus groups.

The focus groups were followed by a trial of the databases involving ten library patrons, varying in age and gender, from each of the library services. The databases were evaluated with ten additional library patrons at SLV in the first half of 2001. In the case of the SLV component of the research, an attempt was made to locate patrons who were already using one of the four databases. The difference between these patrons and those recruited in the four public libraries is that none of the latter group was discovered using a database and none had used one previously. This reflects the difference between the public library clientele and that of SLV where there were 33 terminals available at one time from which users could access the databases.

#### "The diffusion of innovations" component

The other strand of the conceptual framework involves "diffusion of innovation" theory, especially as expounded by Rogers (1962; 1995). Everett Rogers, famous in the literature about the diffusion of innovations, published a landmark study in 1962, *The* 

Diffusion of Innovations, now in its fourth edition. In the latest edition he analyses and critiques the 4,000 publications available at that time—compared with the 405 publications that provided the supporting evidence for the 1962 edition. The theoretical framework he began to develop in the original edition has been revised and updated in each subsequent edition. According to Rogers, innovation is "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (1995, p.11). He describes five attributes of innovations: relative advantage, compatibility, complexity, trialability, and observability.

- "Relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes" (Rogers 1995, p.212). The more the perceived advantage, the more likely innovations are to be adopted: "Relative advantage is perceived by comparing the 'old' way of doing things to the 'new' way" (Haythornwaite 1998, p.16). Particularly relevant to an institutional setting, status, survival, and prestige may be involved as well as issues of cost and efficiency. As Callahan (1991, p.13) says, "in terms of computer applications in libraries, the 'relative advantages' of speed and access are readily apparent."
- "Compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters." This might include compatibility with socio-cultural values and beliefs, with previously introduced ideas, or with client needs for innovation (Rogers 1995, p.224). This attribute has characteristics in common with "relative advantage" and with a "complexity" (discussed below): An innovation that is compatible with previous procedures entails less learning (including of new socio-technical routines) and thus less complexity. Such innovations are more immediately perceived to have an advantage (Haythornwaite 1998, p.22).
- "Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use." Rogers (1995, p.242) generalises that "The complexity of an innovation, as perceived by members of a social system, is negatively related to its rate of adoption." He postulates (p.243) that the perceived complexity of the home computer in the early 1980s "was an important negative force in their rate of adoption." Atkinson and Dowling (2000, p.9, p.13) cite Green (1999) and JISC (1998) with regard to the support users want with new technology.
- "Trialability is the degree to which an innovation may be experimented with on a limited basis" (Rogers 1995, p.243). The idea is that, if people have a chance to try out an innovation without serious financial commitment, they will be more likely to adopt it. This particularly applies to early adopters. Later adopters are surrounded by peers who provide their experience and encouragement. At first glance, this attribute appears to be easily met in the situation of the project discussed in this article as staff and patrons alike have ready access to the databases without any financial commitment at all.
- "Observability is the degree to which the results of an innovation are visible to others" (Rogers 1995, p.244). The idea here is that some innovations are more observable and can more easily be described to others.

As Rogers (1995) sees diffusion of innovation theory, people who are considering adopting an innovation first gain knowledge about the existence of the innovation and its

attributes. If they form a favourable impression, they are persuaded to go further (the persuasion stage) and eventually decide to adopt and implement the innovation.

According to Rogers, the way in which these attributes are perceived by those who are the beneficiaries of the innovation determines both the speed of adaptation and the degree to which a specific innovation is adopted, modified, or ignored. But what happens when an institution or organization makes a decision to adopt an innovation at the governmental or the administrative level rather than at the level of the individual adopter, as happened with the introduction of the four databases into Victorian public libraries under the Gulliver Program? According to Haythornwaite (1998, p.6), in this type of situation, "the adoption process for the individual is cast into disarray, with the persuasion stage following rather than preceding the decision phase." Although Haythornwaite was referring to the impact on school librarians of the adoption of computers in the classroom, this situation is comparable to that in Victoria where most public librarians were not involved in the decision to introduce the Gulliver databases. As Haythornwaite said of the school librarians in her study, public librarians in this position "are more than facilitators, responsible for removing the barriers to adoption—they are also individual adopters, faced with the challenges and stresses of an adoption decision" (p.8). They can embrace the innovation with enthusiasm, reinvent it to match their desires (Markus 1983, cited by Haythornwaite 1998, p.8), use it spasmodically, or not use it at all.

In discussing the findings concerning issues of adoption of online databases in an institutional context, it is mainly data from the focus groups with librarians that will be used. As the data were collected some time ago, the findings should not be seen as reflecting the present situation in Victoria. Rather, the article presents a snapshot in time involving four library services plus a small sample of users from SLV.

## Findings: Issues of user adoption of online databases

This findings section discusses the characteristics of the online databases, *in situ*, that were encouraging adoption as well as perceived barriers to adoption in Victorian public libraries at the time of the Monash University project. The discussion, which is very much from the perspective of the participants in the research in true interpretivist style, is undertaken within Rogers' (1995) framework. A related article (Williamson et al. 2002), providing a different form of analysis although also within the Rogers' 1995 framework, includes further participant quotations on some of the issues.

## Characteristics encouraging adoption of the online databases

Characteristics encouraging adoption of the online databases in Victorian public libraries come within Rogers' (1995) categories of "relative advantage" and "compatibility," with "relative advantage" characteristics being particularly encouraging to adoption.

#### Relative advantage

There were a number of indications from the focus groups that librarians saw the online databases as providing advantages compared with some other forms of information available. They saw the databases as giving them access to a large amount of information in searchable form. It was clear that one of the major advantages of the databases is that librarians feel confident about the authority of the information found on them because the items on the databases are well cited and they have confidence in the authority of the sources. It was a feature that distinguished the databases from the Internet, particularly for health-related queries, which are common, and a sphere in

which authority can have practical significance for patrons.

The availability of full text was a very important reason why the Gulliver databases were seen as having relative advantage over other online resources. As one focus group participant commented: "People would like a citation which they can find." In one session, the Gulliver program was compared favourably with two Australian databases, AUSTROM and AUSTGUIDE, both of which provide only citations. Electric Library was seen as very valuable because it indexes current newspapers. The availability of the *Australian Herald-Sun* was seen as a great asset.

## Compatibility

There is indirect support from the project data for the proposition that online databases were seen as compatible "with the existing values, past experiences, and needs of potential adopters" (Rogers 1995, p.224). It was clear that librarians in the focus groups saw the databases as fitting into the public library setting and as a valuable tool for finding information for both themselves and library patrons. The fact that the Internet was being increasingly used within the library setting meant that many patrons were now having experience with online searching and this, at least on the surface, would make it easier for them to learn the databases.

### Barriers to adoption of the online databases

Barriers to the adoption of the online databases fall into all five of Rogers' (1995) attribute categories.

#### Relative advantage

There were a number of points made which portrayed the online databases as having a relative disadvantage compared with other online forms of information, although the advantages as discussed above were certainly seen to have greater prominence. First,

the fact that many articles retrieved from the databases were from professional or academic publications led some focus group participants to question their utility for broader publics. Second, difficulties in always finding relevant content—which may be as much a consequence of user inexperience as problems with database content—prompted some participants to value the Internet by comparison since "something" could always be found. A common observation was that many patrons have a very instrumentalist approach to information retrieval, wanting broad information rather than journal articles—"something they can take home." Third, it was noted that the topic of the search is crucial, both in relation to individual databases and in general. Some topics, e.g., historical subjects, are not well suited to the Gulliver databases. Fourth, the relative paucity of Australian content in the databases was considered a disadvantage. Finally, some librarians felt that more full text or all full text would improve the databases.

### Compatibility

While the databases were generally seen as compatible with the public library setting, a common point made in the focus groups was that the primary use of library public PCs was for Internet access not related to reference. Patrons were using the Internet "for recreation, e.g., e-mail or looking for sites," and were not interested in the unfamiliar Gulliver databases. Some participants felt that many users lacked broader contextual knowledge about Internet and PC use. Some patrons, it was argued in one focus group, also continue to display unrealistic expectations as to what is involved in information retrieval, whether on the Internet or a database: "a lot of them aren't prepared for the

searching you have to do to find information."

These points about patrons imply that there is some mismatch between their experiences with online sources and those that the databases might offer. This is confirmed by the experiences of the researchers during the fieldwork who did not discover one library patron in any of the four libraries who had used the databases. During the additional fieldwork at SLV, where there are 33 terminals for public use, it took ten hours to find ten patrons using one of the Gulliver databases. It was also found that many librarians had not used the databases either or had used them infrequently. It seems clear that, despite the seeming compatibility with the existing values and needs of library users, the online databases had not been widely adopted with enthusiasm in the libraries involved in the research.

### Complexity

Perceived complexity, Rogers' third attribute, was a very important barrier to the adoption of the databases. There was strong evidence for this in the librarians' focus groups. For example, the importance of feeling confident in the use of various search strategies was a common theme across the focus groups. The researchers concluded that the databases were not being used to an optimal level, even by experienced library staff. The individual patron trials also attested that ignorance of search strategies, in general and in terms of particular databases and queries, was a significant reason for many of the problems encountered.

Discussions in the focus groups about the variations of interfaces among the databases, and the sorts of confusions that these might entail, also indicated that librarians considered the databases to be complex. As one library staffer put it: "If I was a member of the public and I was confronted with all these databases—everyone has a different interface, everyone does something different—it would be an absolute nightmare."

### Trialability

Rogers' fourth attribute concerns the degree to which an innovation may be experimented with on a limited basis (Rogers 1995, p.243). There are, however, other barriers to trialability. In terms of staff, a major barrier to individual experimentation with the databases was lack of time. A recurrent theme of the focus groups was that "time is always pressing" and "a big issue" in a public library context. In addition, patrons' lack of awareness of the existence of the databases was clearly an impediment. In the focus groups, concern was expressed among some staff about the level of promotion for the Gulliver databases. According to one staff member, in their library at least, "if people don't ask for assistance, they may never know that they're there." Individual library patrons may also be diffident about experimenting with the databases without support from a librarian. They may fear embarrassment if they strike problems. Librarians seemed to think that, where patrons did use the databases, it was not uncommon for staff members to provide close support. As was said in one focus group, library users would probably be "very interested" in Gulliver "if you offered to do the work for them." While some patrons were adventurous, many continued to expect that staff would find materials for them, whether these be on the shelves or online.

Another issue, in terms of trialability, was access to the databases. In most libraries, the solid demand for public access terminals raised issues for patron access to databases if and when this was required. One library had designated some PCs as "15 minute-only"; other libraries were considering the possibility of setting aside one or more PCs specifically for public reference use. It was argued in another group that, for them, this was a luxury that could not be afforded, as it would mean "a computer sitting there not

doing much." Furthermore, it was claimed that "the shortage of terminals is probably one of the reasons we don't introduce people to the databases."

A number of libraries reported technical problems in accessing the databases. The focus groups raised concerns about configuration of proxy servers, problems with individual IP addresses for terminals, and use of passwords. It needs to be remembered that the databases had not been long introduced at this stage and that the situation may well have changed since the focus groups met back in the first half of 2000. At least one group, however, reported that such difficulties had led a number of patrons to abandon their attempts to access Gulliver.

### Observability

With regard to the degree to which the results of an innovation are visible to others (Rogers 1995, p.244), the data indicate that the online databases provided through the Gulliver Program were not highly visible. As has been indicated above, this was certainly the case with patrons. In some cases, even staff found that the databases did not spring readily to mind. One focus group member suggested that staff were not always aware of the Gulliver databases, her colleague adding: "We forget they're there and we get very busy." There was a widespread view that the databases could be promoted more effectively. Indeed, it was suggested that current low levels of database usage could be reversed with better promotion, not simply among patrons but also among staff.

#### Conclusion

The analysis of data concerning adoption issues related to online databases, using Rogers'(1995) framework, indicates that in 2000 there were several major barriers to be overcome. That nearly all library services in Victoria decided to subscribe to the databases in 2001 is an indication that a more positive attitude toward adoption has begun to develop.

Although barriers to adoption were seen across the board, three of Rogers' categories —complexity, trialability, and observability—included no characteristics encouraging adoption. In relation to trialability, issues concerned with access to the databases and time pressures were seen to be of greatest importance to librarians in the focus groups. There were major problems of access to the databases, whether the proxy server or passwords were being used. Problems with Internet connections, including slow response times, often exacerbated more specific difficulties. Time pressures meant that librarians were unable to experiment with the databases as much as they would like. In terms of observability, librarians felt that better promotion of the databases would greatly assist in encouraging patrons to use them.

The category of complexity evoked the strongest response. Training was seen as the principal way in which greater use of the databases could be encouraged. In relation to this, the importance of feeling confident in using various search strategies was a common theme across the focus groups. The researchers concluded that the databases were not being used to an optimal level, even by experienced library staff. As one librarian said: "Staff need training on all the different aspects of these databases because they are not always apparent from the first screen." The individual patron trials also demonstrated that ignorance of search strategies, in general, and in terms of particular databases and queries, was a significant reason for many of the problems. Even some librarians who had been trained by SLV staff appeared not to have used the databases extensively. It was considered that the first step before patrons could be encouraged and trained to use the databases was to train library staff. The researchers

concluded that training should involve hands-on tasks to familiarise staff with the databases.

This research set out to evaluate the content, usability, and use of four sets of online databases. Certainly the study shed some light on these issues. The grounded nature of the study, however, allowed the surfacing of what, in fact, was the key issue—the lack of confidence and training among librarians in the use of these resources. The findings thus illustrate the power of a grounded, interpretivist approach compared to the strictly hypothetico-deductive approach where the initial question can effectively limit what can be learned from a process of enquiry.

A new project has sought to remedy the situation revealed in the study by developing the competency of public librarians in using online databases. This project began in September, 2001, in NSW and ACT and is funded by the State Library of NSW and the National Library of Australia. Future articles will report the findings of this project.

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SLV/VICNET also contributed funding to the project. ARC SPIRT grants (now called ARC Linkage) are awarded for projects that involve industry/academic research partnerships. One of the options available under the SPIRT (Linkage) Program is to include one or more PhD or Master's students in the projects for which funding is sought. The Monash/ SLV project has involved a Master's student, Nettie Handley, who received an Australian Postgraduate Award (Industry) to take part in the project.

Members of Enterprise Information Resources Group (EIRG)/Information and Telecommunications Needs Research Group (ITNR) at Monash University in Melbourne, Victoria, were involved in the evaluation of the pilot program in the four public libraries. The Chief Investigators, Associate Professor Frada Burstein and Dr. Kirsty Williamson, received an ARC SPIRT Grant in partnership with SLV/VICNET to undertake the research.

For the "evaluation" findings, see Williamson et al. (2001).