Building bridges to information products and services

Carol Tenopir

School of Information Sciences, University of Tennessee, 1345 Circle Park Drive, 451 Communications Bldg., Knoxville, TN 37966-0341, USA

1. Introduction

As I look back over my career as a librarian, educator, researcher, and observer of the information industry, I think my entire career has been about building bridges – bridges between librarians and publishers; bridges between students and knowledge; and bridges between research and practice.

The more I think about it, the more I realize that the work that everyone connected with the information industry does is about building bridges or helping people build their own bridges – particularly bridges between users and the information they need or bridges between ignorance and knowledge.

The role of information in building bridges has been expressed in the work of communication and information theorists such as Brenda Dervin in her famous depiction of a person with a knowledge gap as a bridge spanner. The bridge over a knowledge gap is built from a combination of ideas, attitudes, feelings, and memories in conjunction with information sources [3].

So, at risk of belaboring the metaphor a bit, my remarks are fashioned around bridges and what types of bridges will lead the information industry into the future, including:

1. The more you know about traffic patterns and preferences, the better your bridge will be (know the user).
2. Be sure to build lots of on ramps.
3. The bridge will never be big enough for the traffic it attracts (continued reengineering is required).
4. The most direct route or, really, the unsupported route may not be the strongest.
5. The fastest way to get there isn’t always the best way to get there.

2. Know your users

Much of my recent research has been about journal article reading patterns and user studies, so it should come as no surprise that my first (and I think most important) admonition is to know your traffic patterns or know your users. Know your users by paying attention to their past and present behavior and by attempting to predict future behavior.

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The majority of information users just want tools and technologies that help them get their work done better and more easily. They do not want to change their work habits unless it is obviously more convenient for them, but systems that help people get their work done better will be readily adopted. Changes in work patterns follow initial adoption.

Desktop access of electronic journals for faculty, links to full articles from indexes, systems that integrate information into updateable spreadsheets or graphs, integration of dictionaries and glossaries into products for children, medical reference books downloadable to a personal digital assistant (PDA), newsfeeds accessible via mobile phones, are all examples of ways that product features help people get their work done and were adopted quickly by a sizable group of the intended population.

These show that knowing the work habits of your major target groups and designing systems for them is the best strategy. These features lead to other ideas for features, which in turn lead to others, so change in habits and adoption occurs by building on better tools and is continual.

I want to share with you just a few research conclusions from studies conducted by Donald W. King (a previous Miles Conrad lecturer) and myself over the last 30 years. Our research is concerned with scientists and social scientists’ use of journals or articles from alternatives to journals for research. We have surveyed over 30,000 scientists, social scientists, and others from both university and non-university settings. Our research mostly focuses on journal use by subject experts (such as researchers, practitioners, and faculty members), although some of the lessons learned translate to other types of information products and other types of users. Our most recent surveys (2004–2006) are of seven universities in the United States and Australia. In 2003 and 2004 we surveyed a random sample of members of the American Astronomical Society and American Academy of Pediatrics, with over 1,000 responses total [4–7].

Our surveys include limited recollection questions such as “how many articles did you read in the last month” and some demographic questions about age, workplace and work responsibilities, but we mostly focus our questions on a variation of the critical incident technique that looks in depth at the last article reading. With critical incident we ask the reader to focus on the last article read (even if it is a rereading) and we can then ask details about purpose, value, and outcome of that specific reading, and make conclusions about the totality of readings by the surveyed user group. Our ongoing research studies have led to several conclusions for subject experts.

First, there is more reading in all subject disciplines than in the past, but in not much more time. (We define reading as going beyond the title and abstract and into the body of the article.) We first started noticing a strange phenomenon in the mid-1990s, where graph lines for articles read and time spent reading (that had pretty much followed each other proportionately) began to diverge. We witnessed more reading, but in not as much more time as you would expect. It seems that reading now is often likely to be skimming or scanning (see Fig. 1).

If we just look at university faculty members, and including preliminary analysis from our new surveys of U.S. and Australian university faculty, we find these trends even more noticeable (see Fig. 2). The average number of readings among university faculty members, for example, is now well over 200 readings per person per year. The increase is probably even greater than this figure shows, because humanities faculty, who read relatively few journal articles, are included in the most current surveys, but were not included in the earlier surveys.

On the other hand, the average time (in minutes) per article for university faculty has steadily decreased. The average reading time is down to just over 30 minutes (see Fig. 3). Scholars are reading more, but also much more quickly. They need information in manageable bites, formatted in ways that allow them to get to the important facts first and quickly.
Fig. 1. Number of articles read per year per scientist and total number of hours spent reading on average per year.

Fig. 2. Average number of articles read per year per university faculty member.

Fig. 3. Average minutes spent per article reading.

Fig. 4. Readings of older materials may be increasing (university faculty).
Another observation is that subject experts still use many ways to locate articles and they choose different ways depending on the purpose of each reading. Although general web search engines are quite popular, especially with students who are in a hurry, young and old scientists still use many sources and tactics to find the information they need. In fact, readers are quite adaptable, browsing for current awareness and through core titles in their disciplines; searching, particularly for new topics, older materials, and for research purposes; following citations manually or more often electronically; receiving articles from colleagues, professors, friends; and, identifying articles through alerting services or other methods.

Both browsing and searching remain important ways to locate articles. Although we have found that a growing percent of articles are found via searching, browsing remains very important. One solution does not replace another; readers are quite adept at using multiple methods for different purposes and at different times. For the first time in our 2004–2005 surveys of Australian universities, we have found that e-alerts account for over 5% of readings. The librarians at the University of New South Wales have aggressively marketed alerts and help faculty set them up, resulting in a greater use of alerting services than observed elsewhere. Subject experts everywhere are also reading from a wide variety of sources – paper journals, e-journals, e-print servers, authors’ web sites, databases.

Reading of older materials also seems to be increasing in the last decade. Until the 1990s the percent of readings overall within the first year of publication remained stable at about two-thirds of all readings done on average in a year [8].

Our most recent surveys of faculty in universities in the United States and Australia show that readings done in the first year of publication has decreased overall to just a bit over half of all readings and
readings of articles beyond the first year of publication are up to almost half (of course total readings have also increased, so absolute numbers of first year readings have not declined) (see Fig. 4).

We are not exactly sure why there is more reading of older materials, but there may be several reasons. One reason is likely the availability of more electronic backfiles in library collections. Another may be time-linked embargoes for open access articles, and another may be the need for more interdisciplinary research requiring more background reading. Clearly libraries’ e-collection policies have an impact on reading patterns, because older materials are more likely to be for research, more likely to come from a library collection, and are described by readers as more valuable to principal purpose.

And finally from our research, while there are some differences in reading patterns depending on factors such as gender and age, there are not as many as you might expect. The information preferences and usage patterns of an older productive (defined as still publishing journal articles) astronomer are more similar to a young productive astronomer, than, for example, to an old productive historian [7].

By far the biggest predictor of differences in reading patterns is subject discipline. This is true across all disciplines; here are just a few examples from two disparate disciplines – medicine and astronomy – compared to faculty as a whole. Doctors (Pediatricians here) read many more current articles – over 80% of their readings are in the first year of publication (see Fig. 5). They also read many more articles, read more from print journals, and spend a record low of 20–22 minutes per article on average. Astronomers, at least in 2003, follow the traditional two-thirds to one-third split that we have observed over time.

Pediatricians browse much more than astronomers, who prefer searching. Pediatricians browse through core titles in their discipline and still rely on paper copies of these journals, at least for the first reading of an article which is likely to be for current awareness (see Fig. 6). Astronomers prefer electronic journals and e-prints.

These differences are closely tied to purpose of reading. Pediatricians do half of their reading for current awareness and an additional third for consulting/diagnosis/and treatment. This requires very fast reading of many articles. University faculty on the whole read much more for research and writing. Astronomers are similar to the faculty.

The more we understand about the complexities of work behavior of all major user groups, the better information products can be. When a product is well designed and its use obviously improves someone’s work life, the more readily it will be adopted. Build systems based on knowledge of users’ needs and work habits.

3. Build many on ramps to content

We can talk in generalities and trends, but there is no single answer for every user or to meet every user’s needs. Knowing your users leads directly to realizing that lots of different onramps are needed to your content.

From the pediatrician who still wants his or her core journal each month delivered in paper so it can be read literally cover to cover anywhere, to the medical student who would rather have important diagnostic and required articles on his or her PDA or mobile phone, to the researcher who needs to do frequent and complex searches, to the student who wants information podcast, there cannot be just one way to get to content. Staying a step ahead of users’ needs (and remembering that the new method does not usually completely replace the old) is the challenge for the information industry and for libraries.

Many library reference departments have done a good job of building onramps, by offering reference services from behind a physical desk, by appointment in an office, email, text chat, instant messaging,
telephone, etc. Publishers are also offering their information in a variety of ways and will need to continue to do so. The old ways are usually not supplanted by the new, making the range and complexity of information delivery options continually increasing.

4. User’s expectations grow quickly

Despite enhancements, the bridge to your information will never be quite good enough for the amount of traffic that it will generate. Users’ expectations grow faster than you can meet them, and the more you provide for people, the more new things they will expect.

Behaviors do change over time and after familiarization – but often just for more and better uses of the same material and systems. As users get accustomed to links to full text, they want links to related materials or databases; if doctors can get drug dosage information on their PDAs, they want diagnostic information. Add that to their need for current awareness and reading on the run and you have a natural new chance (that is really based on old patterns) for adoption of new delivery mechanisms and new products based around mobile technology. New behaviors are a result of becoming familiar and comfortable with sources, technologies, and possibilities.

That means digital products are never finished, either in content, interface, or search engine. One solution does not fit all and the allowable time between enhancements is growing shorter as peoples’ attention span and patience shortens and as expectations heighten. You need something new often because we are building expectations at the same time we are meeting them.

Link to some data sets or video clips and users will wonder why links are not available in all content; provide some full text and users will want to know where the rest of it is; convert backfiles back to 1950 and users will wonder why 1949 isn’t there. No matter what you do it will never be enough in today’s climate of change and high expectations. Looking just at traditional measures such as percent of people who are using a feature or relative amount of use does not help, however. Even though a majority will rarely or even never use a video link, for example, they expect it to be there.

Users expect to be able to interact with information in a multitude of ways depending on their information needs and mood at the time. There is only one area where expectations have gotten less – the expectation to pay for information has gone down – which leads directly to my next point.

5. The unsupported route is not the best

The most direct route or, more accurately, the unsupported route, is not the strongest. Sometimes bridges to our ultimate users need a little help. A bridge between the information system provider and the ultimate end user that has the supporting structure of the information specialist is still stronger than the direct bridge. Many have been trying to build the direct bridge for decades and it just doesn’t hold up as well as expected.

The prevailing attitude remains for most users “I’ll pay for entertainment, but information should be free (to me)”. People who routinely pay $75/month for cable TV, or $10 for a movie ticket, $25 for a novel, or $100 for an opera or a hockey ticket, refuse to pay direct costs for most information. This is one of the hardest lessons for the information industry to learn. For thirty years I’ve heard new CEOs at online companies come in with the “revolutionary” idea that there are only thousands of librarians, but millions of end users. They may try to forgo the middleman or librarian and go directly to the end users.
But that middleman makes the overall collection decisions and makes sure the bills are paid and will continue to do so. The information professional also provides help—help with marketing products and help so people can make the most effective use of information products.

That does not mean the information industry shouldn’t market to astronomers, and physicians, and historians, but it does mean that we cannot expect them to pay the bills directly. The institution will remain the main subsidizer.

There are, of course, a few exceptions, such as information content charges that are hidden in the midst of software or other charges. If content is bundled with Microsoft Office, for example, the charges can be a hidden small charge percent of each software sale that does not directly involve the end user. This had worked in the past with bundled CD-ROM or DVD reference books, but it has to be content that has a wide audience and appeal. Google, by building revenue based on advertising, is another type of successful exception, but the user doesn’t pay directly.

Assuming you are still relying on experts to pay the bills, the trend of making the system do all the work behind the scenes can be frustrating to expert users. Although information product builders may be designing for perpetual novices (infrequent users), they are also designing for another major target group that also pays the bills and these expert users should not be neglected. Even though they may be a minority in terms of numbers, the complexity of their searches and the value of their good will cannot be underestimated. They want to control the search process and need to know something about the algorithm behind statistical ranking or searching. The more this group is told, the better. They need to know enough to troubleshoot even if they are not directly using the system.

6. The fastest route isn’t always the best

And, finally, sometimes the fastest route is not the best. Sometimes a researcher just wants to enjoy the ride and is not in any particular hurry to arrive— in these cases a ferry (or a hot air balloon) works just as well as, or even better than, a bridge.

Serendipity, berry-picking, and browsing are not the most efficient ways to get information, but they are part of the research and development process [1,2]. Researchers need time to think and develop their ideas. Information sources should help them do that. Systems must facilitate thinking in ways beyond the search box, that integrate browse, search, and development and expression of ideas.

In conclusion, don’t let your company or your library be the now proverbial “Bridge to Nowhere”. Not paying attention to users’ needs is the surest road to nowhere, and, a fancy design with no meaningful purpose or content, no quality, no rigor behind the interface will in the long run lead to nowhere.

Subject experts in the workplace want robust and useful content in addition to systems that are easy-to-navigate and effective in getting them where they are going. They want to get their work done faster and better and all of us in this business are in the business together of making sure that happens.

References


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Carol Tenopir, Professor
School of Information Sciences and Interim Director of Research, College of Communication & Information University of Tennessee, 1345 Circle Park Drive, 451 Communications Bldg. Knoxville, TN 37996-0341, USA
Tel.: 865 974 7911; Fax: 865 974 4967; E-mail: ctenopir@utk.edu

Carol Tenopir is a professor at the School of Information Sciences at the University of Tennessee, Knoxville and the Interim Director of Research for the College of Communication & Information. Her areas of teaching and research include: information access and retrieval, electronic publishing, the information industry, online resources, and the impact of technology on reference librarians and scientists. She is the author of five books, including, Communication Patterns of Engineers (IEEE/Wiley InterScience, 2004) with Donald W. King.

Dr. Tenopir has published over 200 journal articles, is a frequent speaker at professional conferences, and since 1983 has written the “Online Databases” column for Library Journal. She is the recipient of the 1993 Outstanding Information Science Teacher Award from the American Society for Information Science/Institute for Scientific Information and the 2000 ALISE Award for Teaching Excellence. She also received the 2002 American Society for Information Science & Technology, Research Award and the 2004 International Information Industry Lifetime Achievement Award. Dr. Tenopir holds a PhD degree in Library and Information Science from the University of Illinois.

About NFAIS

NFAIS, a membership organization comprised of more than 50 of the leading information and information technology providers, was established under the leadership of G. Miles Conrad, the Director of Biological Abstracts, in 1958. Throughout its history, the Federation has dedicated itself to the fulfillment of his vision – the enhancement and advancement of the Information Community through a spirit of communication, collaboration and sharing. This objective is met by: facilitating the exchange of information among NFAIS members; promoting NFAIS members and their essential role within the Information Community; encouraging discussion, understanding and cooperation across all Information Community sectors; sponsoring topical conferences, seminars and educational courses; publishing newsletters, current awareness alerts, books and reports; developing Codes of Practice, Guiding Principles and White