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From Paper to Electronic, the Evolution of Pathfinders:

a Review of the Literature

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Introduction

Pathfinders were first introduced in the 1950's as booklists of recommended readings on a particular topic or of a particular genre (Dunsmore, 2002, p. 138). They are found on most academic library websites and are usually annotated bibliographies of reference materials, databases, journals, and websites within a particular discipline. They are meant to be starting points for research in a subject area. They can also be used as curriculum tools for bibliographic instruction (Reeb and Gibbons, 2004, p. 123). Although there is much duplication among pathfinders from institution to institution, librarians continue to create unique online guides in order to incorporate local situations and for their users' particular needs (Jackson and Pellack, 2004). A pathfinder can be called by one of many different names, for example, research guide or subject guide (Dunsmore, 2002, p. 144), but basically, "A library pathfinder is an organized introductory checklist of various types of English (or other language) sources and materials on a specific topic" (Richardson, 2001, slide 4).

From the point of view of a librarian, pathfinders are useful tools. They provide a good starting point for research in a particular area, without being overwhelming. In 1996, Cox wrote about the benefits of electronic library guides. One obvious advantage is 24/7 access. Users can use electronic guides at their own pace. For some students, electronic pathfinders might be more approachable than a reference desk. Web-based guides are an attractive method of instruction for new generations and providing such guides is good for the image of the library (p. 40). Dunsmore (2002), in her review of the literature found that "…one theme that has been directly expressed or indirectly inferred is that pathfinders are important library publications" (p. 140). Yet, according to

Hjørland, in his analysis of eleven approaches to "domain analysis" for subject specialists, producing pathfinders "…is rather seen as compilatory work than as research" (Hjørland, 2002, p. 424). Jackson and Pellack (2004) found that although online subject guides required a significant amount of time to produce and keep current, according to a survey that they conducted of reference librarians, this work was only minimally considered in librarian evaluations (p. 324).

The question, therefore is, are librarians producing these online guides for other librarians or for library users? Do clients know how useful these guides are? If they are unaware of the existence of pathfinders, then how can one improve online guides so that they will adequately answer clients' needs? Questions on their content, design, marketing and their use in instruction arise. Finally, one must also consider the workload factor. Is technology at a point now where one can finally produce these guides quickly and efficiently?

With these questions in mind, the following review of the literature on pathfinders begins with an assessment of texts written up to the late 1990's in order to provide some historical background on the topic. An attempt to answer these questions with a careful reading of the literature of the last 10 years follows. The article concludes with a presentation of unanswered questions, side by side with a presentation of new questions that arose during this exploration. Suggestions for further research are embedded in this final section.

Traditional pathfinders

Up to the late 1990's, it is safe to say that little "research" was done on the subject of pathfinders. Although libraries have probably always produced reading lists or short

bibliographies on specific subjects, it was in the 1970's that the term Pathfinders* was coined at the Massachusetts Institute of Technology (MIT) by Marie Canfield. In 1972, Canfield defined Pathfinders as "…a checklist of references to those basic sources representing the variety of forms in which information on a specific topic can be found." It "…enables a user to follow an organized search path" (p. 287). In 1973, Canfield and two colleagues from MIT further elaborated and defined the pathfinder as "…a kind of map to the resources of the library; it is an information locator for the library user whose search for recorded materials on a subject is just beginning" (Stevens, Canfield and Gardner, 1973, p. 41). The two MIT articles described in detail how topics were chosen, the Pathfinders' arrangement, their content, compilers, and provided the reader with a template for Pathfinders. The authors also described the cooperative program, the Model Library Project, where other libraries participated in the production of Pathfinders. Finally, they described how the Model Library Project negotiated with the Addison-Wesley Publishing Company the marketing and distribution rights for the Pathfinders. In a 1977 article published in the Encyclopedia of Library and Information Science, Gardner described how although appreciated by the libraries that had purchased and used the Pathfinders, interest in them was "…insufficient to maintain the program" (p. 472). The program was dropped in 1975. Gardner cited the reluctance of most libraries to give up "…local autonomy in selecting topics and matching Pathfinders to their local collections" as the reason why the cooperative venture was discontinued (Gardner, 1977, p.472).

Over the next ten years, only a few articles were published on pathfinders. Out of a handful of articles, one theme was explored by at least four authors, that of readability.

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* The term "Pathfinder" was used as a brand name by these authors and was spelled with an uppercase letter "P".

While Jackson provided tips on how to make pathfinders more readable to the average user (1984), Mayes (1978) and Peterson and Coniglio (1987) measured readability with the use of statistical tests. Jackson stressed the importance of choosing meaningful titles for the guides and for the section headings within and to be sure to begin headings with action verbs (p.470). P.B. Mayes used three readability methods to calculate the reading level of eight research guides. He found that most of the guides were written in college-level English. Peterson and Coniglio, somewhat replicated Mayes' work in 1987. They applied nine readability measures to fourteen guides. Their results were similar to those of Mayes. Almost ten years after Mayes, they noted that a professional challenge still existed for librarians to produce readable library materials (Peterson and Coniglio, 1987, p. 236).

Another concern for some writers was the workload associated with creating subject guides. According to Stevens et. al (1973) and Wilbert (1981), it could take 15 to 20 hours to complete such a project. To circumvent this problem, at least three libraries reported using library science students as compilers of pathfinders (Harbeson, 1972; Stevens et.al, 1973; Wilbert, 1981; Thompson and Stevens, 1985). The pathfinders were prepared as part of course requirements within library science programs. The vast majority of the pathfinders prepared by the students was considered to be of a high quality and was readily accepted by the library staff. The students also received authorship credit for the guides.

Although it was considered important to get user feedback or to at least observe how clients were using the pathfinders, few authors reported actually asking users in a systematic way, how they felt about research guides. "User comments have verified that

the Pathfinders are fulfilling the stated objectives…." (Canfield, 1972, p. 291). How did they collect these user comments? "Not all users employ the Pathfinders as they were designed to be used – moving through the sections from first to last in an orderly sequence" (Stevens et al, 1973, p. 43). In 1977, Gardner reported how MIT students were asked to evaluate the Pathfinders in a survey (p.471). Thompson and Stevens in 1985, refer to "Observation of students' search strategies…." (p. 224) yet they did not explain how they observed the students' strategies. "Librarians need to be observant and pay attention to how people physically use pathfinders (i.e., for research, scrap paper, or coasters) and notice how many end up in a waste basket or recycling bin" (Kapoun, 1995, p. 97). Although, one can agree with this sentiment, it is difficult for librarians to count how many handouts end up in the recycling bin.

Another example of users' opinions not being reported is Davenport and Vajs' 1987 article describing how pathfinders were successfully used in a special library setting, that of the Congressional Research Service (CRS). One of their goals was to "…provide [their] clientele with the means to quickly meet some of their own information needs" (p. 56). In a special library environment, such as the CRS, where clients expect a high level of service, how did the clientele feel about having to meet their own information needs? Did they expect the librarians to do the work for them? Unfortunately, it is not clear as to how well this self-service approach was accepted by the Service's users.

In the mid-1980's, William Jarvis published articles on the possibility of linking subject pathfinders to online catalogs (Jarvis, 1985; Jarvis and Dow, 1986). Although the core idea of pointing users to pathfinders from within the library's catalogue was first

implemented at MIT (Canfield, 1972), Jarvis' idea launched the printed guide onto the online format. Davenport and Vajs also reported a wish to develop an online guide with direct links to the library's catalogue (1987, p. 60).

The year 1995 marks the end of the print pathfinder era, when Jim Kapoun wrote a guide to preparing pathfinders. His short article offered a basic outline of the do's and don'ts of library guides. Each section of the Kapoun article included brief summarizing statements, for example, "Establish a consistent format and content" (Kapoun, 1995, p. 95), or "A pathfinder should offer suggestions, not formulas" (p. 96). Although his article only dealt with print pathfinders, his guidelines were to be cited by subsequent authors as being relevant for electronic pathfinders as well (Dahl, 2001; Hjørland, 2002; Jackson and Pellack, 2004; Wales, 2005).

For the 25 years or so following Marie Canfield's article, the literature was largely descriptive. Questions of content, usage, promotion and instruction were addressed but answered mostly by anecdotal evidence or observations. Suggested guidelines, although useful for anyone beginning such a project, were not really grounded in any kind of empirical research. The only aspect of pathfinders that was scrutinized in any systematic way was the readability of the texts. The late 1990's saw a beginning of attempts at truly answering some questions with the use of quantitative research methods.

Electronic Pathfinders

In 1996, articles began to appear on electronic pathfinders. Morville and Wickhorst gave us systematic instructions on how to prepare such guides (1996). Cox went so far as to provide us with some guidelines as well as applying the guidelines in evaluating the effectiveness of certain online pathfinders. The tone found in these early

works was positive and upbeat, until 1999. Morris and Grimes entitled their paper, "A Great Deal Of Time And Effort: An Overview Of Creating And Maintaining Internet-Based Subject Guides." Since then, librarians have raised some important issues such as topic selection, inclusion criteria, design guidelines, target audience, usage, user evaluations, usability, accessibility, marketing, information literacy, and workload.

Topic selection

How does one determine how broad or how narrow a topic will be effectively covered in a pathfinder? According to Morville and Wickhorst (1996), one must consider if a subject is well suited to research on the Internet. If a topic has not yet made its way on the WWW, it might not be a suitable candidate for an electronic pathfinder. In their 1999 survey of librarians, Morris and Grimes found that most libraries designed guides according to the disciplines on campus or by clients' needs (1999, p.214). Candice Dahl, in her examination of the content and form of online pathfinders on Canadian university library websites, found that many pathfinders were extremely broad, for example, covering all of history or all of English literature. She considered such pathfinders too broad to be helpful (Dahl, 2001, p.234). Wang and Hubbard suggested working closely with faculty and using course catalogs for academic librarians to determine the right topics to choose and the right resources to include in the research guides. For public libraries, Wang and Hubbard suggested using surveys, past experience, and browsing the local media to identify hot topics in the community (2004, p. 621).

In his analysis of the content of electronic subject guides in the area of literary studies, Neilson (2004) found that little had been done on examining how well or how poorly pathfinders "map their subjects" (p. 13). He found that conventionally labeled and

organized pathfinders failed to adequately reflect the increasingly fractured and multi-disciplinary nature of literary studies. He observed that most libraries did not incorporate subcategories of literary studies, such as "African-American Literature" within the pathfinders. Rather, they offered separate subject guides (p. 26). Neilson interpreted this as libraries recognizing the popularity of these sub-disciplines and therefore assigning specific subject guides to them (p. 27). In addition, there was rarely any linkage between the literary studies guides and these specialized guides. They "… often do not take advantage of the web's ability to link across disciplines, to electronically enable the cross-disciplinary practice of Literary Studies" (Neilson, 2004, p. 28).

Inclusion criteria

Grimes and Morris, in their survey of 18 university libraries across the United States and 35 member libraries of the Association of Southeast Research Libraries (ASERL), found that few libraries used formal, written selection policies in determining what websites to link to from their pathfinders (2001). In terms of formulating a scope, in 2001, Dahl found that most of the Canadian libraries' pathfinders in her study did not include a scope note or a definition on the subject covered by the pathfinder. Yet, one year later, Dunsmore (2002) having examined the pathfinders from "well-recognized" business schools in Canada, found that 62% of the pathfinders she examined had introductory paragraphs, telling users exactly what the scope of the pathfinder was (p. 142).

Most librarians reported relying on surfing the Web for identifying websites for their pathfinders. Some used directories such as ARGUS. Current awareness guides, colleagues and other sources such as Choice reviews were also used to identify potential

entries (Grimes and Morris, 2001). Internet Scout Project began in 1994 (http://scout.cs.wisc.edu). Until today, the Scouts scan announcements of new web sites and on a weekly basis select twenty sites of particular interest. Each item is catalogued and added to a searchable database, making it of great value to librarians and other researchers (O'Leary, 2001, p.78). Sugarman and Demetracopoulos (2001) reported another interesting method in identifying suitable websites for their web-based research guide on world history. A professor of world history and his graduate students were actively involved in the identifying and annotating of suitable sites.

Troubled by the major time commitments involved in producing subject guides, Jackson and Pellack "…decided to find out just how unique these guides really are" (2004, p. 319). They found that no work had been done on the duplication of effort or the uniqueness of pathfinders (p. 321). They examined the guides of four subject areas appearing on the websites of ARL libraries. They found that a majority of the links on subject pages were unique (p. 322). Some of the sites were considered useful in the discipline and should have been on all subject guides, regardless of the home institution. However, the authors found that numerous resources were questionable, for example listing INSPEC on a philosophy page (p. 323). They also surveyed reference librarians on their perceptions of research guides. They found that less than half of the libraries deleted outdated subject guides, "One disturbing comment was that 'we think something is better than nothing'" (p. 325). Further related to currency, they found that the dates on guides were not reliable. This was a major concern to them (p. 326).

Design guidelines

Once a suitable topic has been chosen and a collection of interesting websites has been compiled, what is the best way to present this information to the guide's users? Cox examined and reviewed some innovative websites in 1996 and came up with a list of suggestions on building effective pathfinders (Cox, 1996). In 2001, Candace Dahl, looked at 45 electronic pathfinders, selected from nine Canadian universities. She examined them vis-à-vis "guidelines in the existing literature", mainly using Jim Kapoun's guidelines regarding traditional pathfinders. Dahl mentioned combining Kapoun's ideas with those of other writers to come up with her own guidelines, but she did not cite the other writers' names (p. 227-229). She found that guidelines were not consistently followed within each institution.

Her analysis was divided into four categories: consistency, scope, readability and use/usability. For example, she found it useful when a pathfinder could be viewed in its totality from a single location (p. 236). Another consideration was the ease with which a pathfinder could be printed. According to her, in addition to providing a link to a website, pathfinders should include the website's address, so that the user could access the information from another location. She found that comprehensive universities' pathfinders ranked first in terms of these guidelines, followed by the medical/doctoral universities. Dahl noted with some concern that undergraduate institutions, that are expected to have the best research aids because of their student bodies, ranked primarily low (pp. 231-232).

Dahl concluded that comprehensive guidelines, especially formulated for electronic pathfinders, would be useful (2001, p. 237). Prior to 2001, when Dahl's article

was published, at least one set of guidelines specifically intended for electronic subject guides was set forth by Andrew Cox (1996). Since 2001, several authors have proposed guidelines for online pathfinders. Some specifically called them "guidelines" and presented them as such. Others mentioned their preferences but did not call them guidelines. The following table is a distillation of some authors' thoughts and preferences. The first part of the table lists Kapoun's guidelines for print pathfinders.

See Table I in the Annex (end of document)

See Table II in the Annex (end of document)

There does not seem to be a consensus on pathfinder guidelines. There is general agreement on some points and there is disagreement on others. For example, Dahl rated highly pathfinders that could be viewed in their entirety in one page but Dunsmore, found tables of contents on webpages to be useful. They allowed the pathfinders to become quite large, yet they permitted ease of use of the guide (2002, p. 146). Perhaps there is no right or wrong way to set up pathfinders. Perhaps a greater attempt should be made to ask users directly what they think of the guides. Joy Moll, in writing up her guidelines admitted that her findings were not confirmed by usability studies but they were meant to provide a starting point for that type of research (Moll, 2003, Introduction, para. 5).

Target audience

Perhaps the first essential step in effectively marketing library pathfinders is to identify a target audience or target market. Peter A. Hook emphasized that only once the audience has been clearly identified, information about the user population, its needs and objectives will ultimately determine the design of the pathfinder (Hook, 2002, p. 253). The answer to the question, "Who is this guide for?" will "…drive the evaluation,

selection, and classification of resources" (Dean, 1998, p. 83). Yet, there seems to be some confusion about who is the intended audience. Most librarians would say that their pathfinders are intended for students and other clients in the early stages of the research process. However, when Jackson and Pellack asked reference librarians if they considered pathfinders to be useful, most responded that their guides were useful, especially for training purposes and to assist librarians at the reference desk (2004, p. 325) If they are primarily used by librarians, are pathfinders being inadvertently designed for other librarians rather than for users?

Usage

Once it has been determined who the target audience is, attempts must be made to become acquainted with this audience as much as possible. First, how many clients are there? How many times are the online guides used? Can the website generate usage statistics and how can these numbers help in getting a better picture of the use of these tools? According to Cox (1996), data can be automatically collected from websites. Yet, Morris and Grimes (2001) found that less than half of the libraries they surveyed kept any kind of usage statistics of their research guides. "The results suggest that academic librarians devote much manpower to the development and maintenance of webliographies, but relatively little is done to monitor their use by patrons" (Morris and Grimes, 2001, p. 75). Jackson and Pellack (p. 326) confirmed this in 2004. Reeb and Gibbons refer to seemingly low usage statistics for online pathfinders. For example, they report that at Wright State University, 55 of its 65 subject guides logged less than 300 hits in one month (April) (p. 124). However, they do not place the numbers in any kind

of context. How does this number, 300, compare to other webpages on that website and to print sources?

User evaluations

Most libraries, one imagines, would question its staff putting much time and effort into a publication that remains on the pegboard; yet, it seems that this is not the case with electronic resources. Instead, it is assumed that clients will use a tool, simply because it is online. In 2003, Trina Magi, University of Vermont, compared the effectiveness of a print pathfinder to an online guide for undergraduate business students. The online guide, the *Business Information Locator* (BIL), was a database-driven, interactive web-based tool (Magi, 2003, p. 671). The purpose of her study was to find out if it would be in the students' interest to replace a traditional print pathfinder with an interactive web tool (Magi, 2003, p. 671). "Preliminary discussions about the tool with reference librarians and instructional faculty were met with great enthusiasm, with many commenting that students are web-savvy and would probably prefer a web-based tool" (Magi, 2003, p 673). To find out if this was the case, Magi set up an elaborate and interesting project. She used quantitative methods and open-ended survey questions for qualitative data. A sample was made up of students enrolled in two sections of one course: Management and Information Technology. The students were in their first year of university. One section was given the print pathfinder; the other was assigned the online version. At the end of a library instruction session, students were asked to fill out a written survey to evaluate the session. Results of the survey showed that the students from each section had found the instruction session equally helpful. The students then went on to prepare their assignments, with the print pathfinder or the online guide (p.

677). In the class preceding the day the assignments were due, the students were asked to complete a second questionnaire about the print pathfinder or the *Business Information Locator*. The results of this survey were greatly different. On every count, the students that had been assigned the print pathfinder had expressed a greater satisfaction than the students that had been assigned the *Locator* (Magi, 2003, p. 675); interesting results coming from "web-savvy" business students. In the end, Magi admitted that if the University of Vermont Library was to continue with the *BIL*, qualitative usability testing or focus group research would be needed to help identify ways to improve the electronic pathfinder (Magi, 2003, p. 685).

Assuming that some students do use electronic research guides, little is known as to why they are using them. Dahl recommended further research on the use that students make of research guides. Dunsmore examined the navigational pathways to the pathfinders with the "breadcrumb trail" method (2002). It would be interesting to monitor actual students' trails through a website. In addition, it would be useful to ask students what kind of information they are looking for when they turn to a pathfinder. Are they looking for factual information? Journal articles? How to fill out an interlibrary loan form? Troubleshooting information? This would have an impact on the content of the pathfinders.

Usability

The next question that arises is, "*How* do students and other clients use pathfinders?" One interesting instance of students being asked to evaluate pathfinders in a systematic fashion can be found in Charles W. Dean's 1998 article on preparing an electronic pathfinder in the area of biology. Undergraduate biology students in two

laboratory sections were given a series of exercises in order to evaluate the biology subject guide. They were first given the major resource headings present on the main page of the pathfinder. Students recorded what they expected to find there. Then, the students were given a list of resources present in the guide and they recorded what they would expect to find in these items. This exercise showed that some headings were unclear to the users. The students then participated in a hands-on exercise. They were asked to record their paths in finding a list of resources using the guide. Dean found that some terms were not easily understood by the students, such as, "Full-text Resources". He also found that explicit headings, such as "Dictionaries, Glossaries, and Other Reference Materials" worked better than "Reference Tools and Resources". It is interesting to note that, "The students often relied on the headings themselves, rather than their fuller descriptive annotations, in making their search selections" (Dean, 1998, p. 85). *(Yet the inclusion of annotations was deemed a desirable guideline for many other authors: Dahl, Moll, Jackson and Pellack, and Wang and Hubbard).* The same students were then asked to participate in focus group discussions. This testing and interviewing of users, led the team to make some changes to the guide before submitting it to similar testing and evaluation by graduate students (p. 86). Following that, they interviewed faculty members before making the guide "live" on the library website (Dean, 1998).

O'Sullivan and Scott (2002) described how they set up an electronic pathfinder in a high school library. Their first step was to survey the students on their research skills, or what they perceived their skills to be. They then designed a pathfinder for a specific classroom assignment on "international studies" (p. 40). After the students completed their assignments, they were asked to evaluate the pathfinder. Although most students

reported finding the pathfinder useful, many found it confusing and admitted to not knowing how to use it. Although the pathfinder pointed students in the right direction, it did not give them the answers. Some students expected exactly that, however. After the first class evaluated the pathfinder, O'Sullivan and Scott started to demonstrate the pathfinder in class before the start of the assignment. This approach increased the satisfaction rate from the students (p. 41). However, the authors did not take the opportunity to change the format of the pathfinder so that students could use it on their own, without any prior training.

Reeb and Gibbons (2004) referred to unpublished usability tests conducted at MIT Libraries that resulted in the observation that users were not familiar with their subject guides (p. 124). Their own usability tests at the University of Rochester brought them to the conclusion that students "never grasp the concept of a 'discipline'" (p. 125). When faced with open-ended questions about finding information on a specific topic, students did not turn to the subject guides. Instead, they were observed using search engines, such as Google (p. 125). There is much to be learned by seeing the actual results of their usability tests. MIT has the raw data from their testing online but it is difficult to read and to interpret. Additionally, it would be both interesting and useful for someone who has conducted usability tests on a subject guide to make available what they learned and how their testing affected the final look of the guide, a sort of "before and after" of pathfinders.

Accessibility

Increasing the use of subject guides constitutes the next question or challenge. Making sure that users can readily find these resources is a step in the right direction.

Yet, Dunsmore found that many library websites did not point to pathfinders on their homepage (2002, p. 145). This starting point would seem to be the most obvious place to promote subject guides. Another way to make guides more easily accessible and contextual is to provide access points to them in areas of the library's website that are of a high research and coursework context for students, for example, the "online database" page (Reeb and Gibbons, 2004, p. 127). Reeb and Gibbons also suggested that course pages on systems such as WebCT could also connect to the subject guides. In the case of multidisciplinary courses, course websites could connect to more than one guide. For example, a course page on "Literature through Film" would connect to both the literature and film guides (p. 128).

Marketing

A few authors have addressed the question of further promotion (Bunnell and Byerley, 2000; Wilson, 2002; Vuotto, 2004). Moll's paper (2003) lists several ways one can promote pathfinders:

- Use pathfinders in library instruction classes
- At the reference desk, refer users to guides
- Advertise them on bookmarks and distribute them from service points and at campus events
- Catalog guides and include them in the library's OPAC
- Post a flyer about a particular subject guide on the relevant department's bulletin board
- Hold a "house-warming party" for a new subject guide, inviting faculty who teach in that subject

- Unveil a new subject guide at the meeting of the student chapter group
- Request that academic departments link from their web pages to their corresponding subject guides (Moll, #7: Promote subject guides)

Much can be gained by engaging users into the creation of pathfinders. The final product will be more relevant and easier to promote.

Information literacy

Considering how much time and effort is involved in the production of pathfinders, it would make sense that they serve both a reference purpose and as teaching tools. "Online tutorials are available when students need them most….an online tutorial is readily accessible the moment an individual discovers that he or she must learn something in order to complete a task….adults learn best when they are 'ready to learn'" (Hook, 2002, p. 250). This point of view fits in well with Magi's findings where she found that students preferred the print version of the business guide to the online version. However, she also found, after examining the students' assignments, that there was no significant difference between the two sections. On average, both sets of students cited the same number of business sources, thus achieving the learning outcome (2003, p. 684). The students learned from both guides because they needed to in order to complete their assignment, regardless of the format of the guide.

The Agribusiness Research Portal at the California Polytechnic (Cal Poly) State University in San Luis Obispo was originally designed to complement research instruction sessions given by the subject specialist. Now, it is "…fully integrated into teaching and learning activities in the department [of agribusiness]" (Somerville and Vuotto, 2005, p. 83). The course-specific research guides were created through

"…faculty and librarian collaboration to guide students through course-driven research" (p. 84). "…content was also influenced by other variables including faculty-determined course learning outcomes, disciplinary department-driven course learning outcomes, disciplinary department-driven mission objectives, and college accreditation agency mandated criteria thinking skills." (p. 84)

Vuotto used the four Ps of marketing, product, place (distribution), price and promotion as a strategy in presenting the business portal he created at Cal Poly (2004, p. 235). "The idea of an information competence Web site as a product – created to meet a specific need, delivered and distributed effectively while keeping costs down, and promoted through a variety of marketing venues – set the backdrop for this entire project" (p. 234). He promoted the portal to faculty and students, largely in instruction sessions. He also prepared and handed out an eight-page handout for new students entitled, "Building a better business student: an essential guide for new business students" (p. 247). However, the single most important tactic he used in promoting the guide was to integrate it into the curriculum (p. 247).

While Vuotto used a basic marketing model for the creation and evaluation of pathfinders in library instruction, William Hemmig (2005) examined the literature on information seeking behaviour and that of pathfinders. He compared and merged several models (p. 82). He found that a gap existed in the pathfinder literature. A multi-dimensional picture of the user and the user's experience via the pathfinder was missing (2005, p. 66). Hemmig concluded that throughout the history of "pathfinder theory" there has been a lack of balance between the system and user sides. There was a gap in our understanding of the user and the user's contributions to the interaction (p. 83). He

encased the literature devoted to user-centered modeling and tried to create a "portrait" of the user and the "entire research guide interaction" (p. 84). He pointed to the lack of published studies of actual research guide use (p. 84).

It seems that in order for pathfinders to be useful information literacy tools, they must be created in conjunction with teachers, taking into account the various learning styles of individuals.

Workload

No discussion of pathfinders, traditional or electronic, is complete without mention of workload. Sugarman and Demetracopoulos, when reflecting upon the process of setting up their world history pathfinder, considered the project to be a great success, yet they acknowledge the challenge of balancing such a time-consuming project with other professional responsibilities (2001, p. 156). Charles Dean, in 1998, described how at the University of Wisconsin, a committee developed a research guide in biology. Dean admitted that whenever this committee met, "lively discussions" ensued about the time required to develop such a guide (p. 82). At Poly Cal, librarians no longer provide front-line reference service. Technicians instead provide this service, with the help of the online guides produced by professionals (Somerville and Vuotto, 2005, p. 89-90). "The centerpiece for the new subject specialist model is information literacy that has been transformed from a library-centered notion to a core educational concept integrated seamlessly in disciplinary curriculum" (p. 90-91).

How many librarians are willing to forgo reference duty in order to spend more time on information literacy projects? Other options exist to simplify the pathfinder creation process. In 1998, OCLC initiated the *Cooperative Online Resource Catalog*

(CORC). Its aim was to facilitate "…the cooperative creation by libraries of a database of Web resources" (OCLC, 2006, para. 5). In January 1999, CORC comprised of 200 pathfinders. Two years later, the database had grown to 1700 pathfinders (Richardson, 2001). What started out as a pilot project is now part of OCLC's integrated cataloguing service, *OCLC Connexion*. The initiative was at first well received by the library community. However, in recent years not much has been written about it. Wales (2005) reported how at Open University Library (OUL), UK, subject guides were produced in a variety of formats: print, CD-ROM and static web pages. In order to simplify the production process, OUL implemented on a trial basis a content management system (CMS). Due to the complex nature of pathfinders, OUL decided, after one year, to stop using the CMS and to revert to previous methods (p. 120).

Other authors have reported successfully implementing database-driven pathfinders (Magi, 2003; Bills, Cheng, and Nathanson, 2003; Dupuis, Ryan, and Steeves, 2004, and Reeb and Gibbons, 2004).

Bills, Cheng, and Nathanson (2003) described how two institutions, Wesleyan University Library (WUL) and Tri-College Consortium (TCC) moved away from static HTML pathfinders. Each used relational databases to streamline the creation and management of subject guides. Because not all librarians were equally comfortable with writing online guides, this caused delays in the creation and maintenance of pages. The goal at both institutions was "…to enable librarians… to quickly enter or select resources and arrange them on a page through a simple staff interface" (p. 4). Wesleyan University Library used a method similar to that reported by Magi at University of Vermont Library (2003). Their solution was to build on an existing database of electronic resources,

separate from their library catalog" (p. 4). At WUL student programmers designed the database. This approach, "…automatically provides the library with user input on design issues, while librarians are consulted on more formal issues" (p. 6). The database automatically gathered usage statistics. In the past, librarians there had frequently asked themselves if all the effort they put into the production of online pathfinders was worth the trouble. "By generating and updating subject guides dynamically, the entire operation has become efficient enough that justification is no longer needed" (p. 10).

Tri-College Consortium used a different approach. It had a policy of entering records for all online resources, both subscription and free, in their online library catalogue (Bills, Cheng, and Nathanson, 2003, p. 4). Their web guide publishing application was built using commercial software (MS SQL and ColdFusion). They outsourced the initial development (p. 5). Both WUL and TCC have given "…the librarians flexibility to write their own resource annotations, to display the resources in order of importance, and to use as many or as few categories as they believe necessary" (p. 10-11).

A similar project at York University Libraries (YUL) had a team of four librarians and "several" members of Library Computing Services use a content management system to create a framework for producing subject guides (Dupuis, Ryan, and Steeves, 2004, p. 271). Their target audience was undergraduate students as they have traditionally been the heaviest users of online research help at YUL (p. 271). The subject guides were built upon three components: an e-resource database, a CMS, and the "Find articles by subject" page on the YUL website (p. 272). Since they already had a database of electronic resources, subject librarians could extend this by adding print resources if

desired (p. 273). The authors in their conclusion addressed this duplication of effort with the cataloguing department. It was one of their future projects to link from the subject guides to the library catalogue. This would allow librarians to include print resources without entering them manually (p. 277).

According to Reeb and Gibbons (2004), students are used to customization and personalization. Students are frustrated when they arrive at libraries' webpages that are not tailored to their specific needs. To meet their clients' requirements, the librarians at the University of Rochester, have devised a method called the CoURse Resources System, whereby librarians can quickly create pathfinders for specific courses. The guides are listed by course number (p.126). Reeb and Gibbons considered this method beneficial for librarians as well as students. After four months of having the system in place, anecdotal evidence suggested that librarians felt to be more informed about the curriculum and made better collection development decisions (p. 127). It is interesting to note that although the authors performed usability tests on the static web pages, they did not report similar testing of these new course guides. It would be beneficial to see the results of such a project.

It seems that in all the cases reported, a great amount of time and resources were invested in the initial set up of a database-driven system. However, the streamlined process greatly enhanced productivity thus cutting down on the cost in the end.

Other libraries, for example Ohio University Libraries, have been using wiki technology to set up the "Biz Wiki", a subject guide to business sources (Boeninger 2005). The University of South Carolina has its entire web site, including its subject guides, on a wiki (http://library.usca.edu/index.php). Meredith Farkas has been

advocating the use of wiki technology in libraries. Wikis are easy to use, do not require any knowledge of HTML and allow all members of a community to add to the web site (Farkas, 2007).

In the literature to date it was found that many librarians are attempting to simplify the pathfinder building process with databases or more recently with wiki technology. On the other hand, we have the situation at California Polytechnic where the meshing of online guides into the curriculum has resulted in a complete reorganization of workload, with professional librarians no longer staffing the reference desk. In the end, the matter of which approach will be the most efficient and the most beneficial for library clients remains unresolved.

Conclusion

Until 1996, little had been published on the subject of pathfinders and even less was based on research. Although these writings were useful in that they allowed librarians to share their experiences, they did not allow one to draw any concrete conclusions from them. In the past ten years, much of the same kind of literature has been produced, while some more formal research is taking place. Some writers have interviewed, surveyed and tested both users and librarians. Yet, many of the questions asked at the beginning of this article remain unanswered. Although it seems that librarians produce pathfinders for their clients, few have reported using focus groups, surveys or usability tests in order to discover their target audience's needs. Instead, the predominant method of identifying clients' requirements is by putting "…ourselves into the role of…" the users (Digby, 2004, p. 55). Because little is still known about what clients prefer, no clear guidelines exist, thus complicating the production process.

Increasing client input could make pathfinders more relevant, more useful in the information literacy process and easier to promote. Options for content, form and style for both the traditional print pathfinder and electronic pathfinders are endless. Indeed, with a clearer idea of what is required and with exciting, new technologies, pathfinders can be interesting and useful information services in and of themselves. Pathfinders have enjoyed a particular niche and status within the references services environs; the Web offers both new challenges and new opportunities for the further evolution of these resources.

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ANNEX

Table I: Pathfinder guidelines as found in the literature, Kapoun

Ask yourself, “Am I required to make pathfinders?”	Kapoun	1995
Establish consistent format and content	Kapoun	1995
Select a format that is easy to follow and produce	Kapoun	1995
Tailor the design to the library’s resources, budget, staff, and collection	Kapoun	1995
Ask yourself, “Can I construct a good document in a timely manner?”	Kapoun	1995
Ask yourself, “Is a pathfinder necessary on this topic?”	Kapoun	1995
A pathfinder should offer suggestions, not formulas	Kapoun	1995
Select topics consistently	Kapoun	1995
Evaluate scope	Kapoun	1995
Define cost in terms of staff, time and supplies	Kapoun	1995
Control the use of jargon	Kapoun	1995

Table II: Pathfinder guidelines as found in the literature, Electronic pathfinders

Establish consistent format and content	Cox	1996
	Dahl	2001
	Wilson	2002
	Moll	2003
	Jackson and Pellack	2004
Keep pages short	Cox	1996
Use a broad, shallow structure	Cox	1996
Use a core page/ table of contents	Cox	1996
	Dunsmore	2002
Be sure your pathfinder is no more than 2 pages in length	Wilson	2002
It should all fit on one page so that it can easily be printed and read offline	Dahl	2001
	Moll	2003
A pathfinder can be 2-5 pages long	Wang and Hubbard	2004
Offer your pathfinder in both HTML and PDF formats	Wilson	2002
It is important that the pathfinder remain open so that users can refer back to it	Wilson	2002
Pathfinders must not only list but also teach students to use a variety of resources	Dahl	2001
Use annotations	Moll	2003
	Jackson and Pellack	2004
	Wang and Hubbard	2004
Link to the guides from the library's home page	Cox	1996
	Dunsmore	2002
	Moll	2003

	Jackson and Pellack	2004
	Wang and Hubbard	2004
Link to the guides from pages of "high research and coursework context	Reeb and Gibbons	2004
Be accurate	Cox	1996
Keep the subject guide current	Cox	1996
	Moll	2003
	Wang and Hubbard	2004
Include revision dates on the web page	Moll	2003
	Wang and Hubbard	2004
Remove outdated subject guides	Jackson and Pellack	2004
Use the appropriate media for the particular message	Cox	1996
Avoid the use of jargon, ensure readability	Dahl	2001
	Cox	1996
Use "trigger words"	Reeb and Gibbons	2004
Use an attractive and engaging style	Cox	1996
Use icons	Cox	1996
Use a horizontal navigational bar at the top of your pathfinder	Wilson	2002
Use appealing graphics	Wilson	2002
Use adequate font size	Jackson and Pellack	2004
Avoid multiple frames	Jackson and Pellack	2004

Avoid glaring background colours	Jackson and Pellack	2004
Avoid busy pages	Jackson and Pellack	2004
The destination of the links should be clearly indicated	Cox	1996
URLs should be included on the page	Dahl	2001
	Jackson and Pellack	2004
Display the URLs for each link in your PDF document	Wilson	2002
Pathfinders should cover a subject that is not too narrow and not too broad	Dahl	2001
Set up a service mission for the guide	Wang and Hubbard	2004
Define the target audience	Wang and Hubbard	2004
The scope should be defined in an introduction	Dahl	2001
	Dunsmore	2002
	Wang and Hubbard	2004
Pathfinders should point to a full range of resources	Dahl	2001
Clearly distinguish between freely accessible resources and those that require a library card	Wilson	2002
Point to local resources	Moll	2003
Always list the librarian's contact information	Wang and Hubbard	2004
Include subject heading and call number ranges	Dahl	2001
	Wang and Hubbard	2004
Sources should be consistently organized by category and then	Cox	1996

in alphabetical order	Jackson and Pellack	2004
Keep and evaluate usage statistics	Jackson and Pellack	2004
	Wang and Hubbard	2004
Test the site with users	Moll	2003
Consider users' feedback	Wang and Hubbard	2004
Use a meaningful and representative synonym for the term pathfinder	Dunsmore	2002
Create a catchy name for your pathfinders	Wilson	2002
Call it a 'subject guide'	Moll	2003
Use pathfinders to market your website	Wilson	2002
Promote subject guides	Moll	2003
Make pathfinders accessible through the library catalog	Wilson Moll	2002 2003