# An Exploratory Survey of Reference Source Instruction in LIS Courses

*Because reference sources are a staple of reference service, reference source education is an intrinsic part of reference education. However, limited information exists about the strategies reference instructors use to teach their students about sources. Reference instructors at forty-eight ALA-accredited programs of library and information studies were surveyed as to what strategies they used to teach about sources, what methods they felt were effective, and what challenges they faced in teaching about reference sources. Forty respondents described a total of sixty-one courses taught. In describing those courses, instructors indicated that reference source instruction primarily occurred through discussion and students' hands-on experience, although that experience was not always provided in class. Instructors provided information on challenges in source instruction, including access to print and electronic reference sources.*

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In a review of papers presented at a Reference and User Services Forum in 2002, Richardson Jr. suggested that provision of reference services involves a confluence of three factors: information resources, information technology, and users.[1] This paper focuses on one of those factors, information resources (herein called reference sources), and the practice of teaching about those sources to future librarians in American Library Association (ALA) accredited library and information science (LIS) programs in the United States.

Reference sources facilitate easy access to snippets of information. Effective reference practice requires a thorough knowledge of a variety of reference sources, thus making librarians' ability to use these sources an essential aspect of their professional practice. Reference courses provided in LIS programs teach library students to use various reference sources to become familiar with finding information and providing it in the right format for the information seeker. Recently, both LIS educators and librarians have voiced concerns about trends in reference source instruction. For example, at the Association for Library and Information Science Education (ALISE) conference in 2003, reference educators in the Teaching Methods Special Interest Group discussed the difficulty of balancing reference source and service instruction in one semester, the need to cover a vast number of reference sources in one course, and the difficulty of putting use of reference sources in the appropriate context to facilitate students' learning. Reference instructors also shared that students increasingly rely on Google to answer practice reference questions rather than exploring print sources. However, even before Google, developments in information technologies and the growth of the Internet in the 1990s heralded a time of fundamental change for reference source instruction. Because

many reference sources became available online, the coverage of reference instruction has expanded to include not only traditional paper formats but also multiple electronic formats such as CD-ROMs, proprietary databases, and the Web. This expansion of format coverage has placed new demands on reference instruction.

Knowing how LIS reference educators manage reference source instruction in the changing environment is of interest to many categories of library professionals. It may assist new educators in determining successful instructional strategies, allow experienced reference instructors to understand the shared concerns of reference instruction, or familiarize practicing professionals with some of the strengths and limitations of LIS reference education. There is limited information currently available about current practices in reference source instruction. To expand upon this limited information, an exploratory survey of reference instructors at ALA-accredited LIS programs was conducted to determine the teaching methods they use to present reference sources to their students. Two broad questions guided the research: what instructional methods do instructors use in teaching reference sources? What are the most effective and most challenging aspects of presenting reference sources to students?

## LITERATURE REVIEW

Rothstein's brief history of LIS reference education describes the contentions within that education.[2] The principal question for Rothstein was: what should reference instructors teach to their students? Should the instruction concentrate on memorization of specific sources, usage of various types of sources, or should it be focused on communication and operational issues inherent in reference encounters? This issue speaks to the larger issue of what role the reference librarian plays in the reference encounter.

In 1876, Green portrayed the librarian as pleasant and helpful, though very much the social and intellectual superior of the reader being assisted.[3] The role of the librarian in offering this personalized assistance was not to provide answers for the patron, but to teach the patron to be self-sufficient. However, this "conservative theory of reference work" was not universally accepted, with some librarians advocating and practicing more direct provision of information. The debate about whether the reference librarian facilitates or furnishes access to information is ongoing, particularly in academic and school libraries.

Another concern was what educational background would best serve the reference librarian. With the development of specialized reference departments in the 1910s, reference librarians were sought who had expertise in certain fields, and library schools developed specialized reference courses.[4] The question dealt with by the profession was: is specialized reference training necessary, or could anyone learn to negotiate unfamiliar reference territory through the use of "reference strategy"?[5] Some academic libraries have traditionally sought candidates with advanced subject degrees to complement the ALA-accredited LIS degree.[6] The idea of an intensive library fellowship as an alternate route into librarianship for humanities scholars has been developed and debated by librarians.[7] Do librarians with advanced degrees bring extra knowledge to the table that librarians with the MLS equivalent do not have? This is another question still being debated in the profession.

Rothstein describes changes in reference education from the primarily source-based instruction of the first half of the twentieth century to the more operational focus of reference interviews, patron interaction, and types of sources.[8] Other evidence of this transition comes from Powell and Raber, who in 1994 provided an extensive review of literature on reference instruction and concluded that there has been "a gradual shift … from the consideration of titles and queries to the broader concerns of information service."[9] While in the 1970s and 1980s, reference courses emphasized the use of sources, by the 1990s the educational content of reference courses was expanded to include topics such as patron interaction and technological mastery. Richardson Jr. points out a 1930 reference textbook that delineates appropriate personality traits of the reference librarian, saying that "the [reference instruction] paradigm has undergone a shift from formats to method and back again."[10] New technology, new sources, and new views of reference interactions have been added into an already-crowded reference curriculum.

Despite introduction of new curricular elements, knowing which reference sources to use and how to use them remains a fundamental component of reference service. Reference educators have historically maintained that some source knowledge is essential. The importance of source instruction has been supported in both research and practice-oriented literature of the pre-Web era. A survey of LIS schools published in 1989 revealed that all types of sources were taught in 100 percent of responding schools' reference classes.[11] In another study, reference instructors ranked source instruction as being more important than instruction in reference services or reference philosophy.[12] An adjunct instructor of general reference presented a generalized reference syllabus in which twelve out of fourteen weeks were occupied with the review of some type of information source.[13]

LIS practitioners also support the idea that the foundation for effective reference services is the ability to select, evaluate, and use information resources. The 2003 summary of reference competencies compiled by the Reference and User Services Association (RUSA) indicates that librarians must be able to: choose among multiple information sources to find the best one for a patron; organize and present information sources so as to maximize patron access; and know how to use both print and electronic sources.[14] These competencies represent the skills and abilities that practicing librarians believe reference librarians must possess. Accordingly, knowledge of sources is assumed to be an explicit characteristic of a truly competent professional.

LIS literature suggests that nonprint reference sources have historically received less instructional coverage than print sources. Summarizing reference instruction up to 1990, Richardson Jr. noted that "formats such as microforms, and more recent technologies including online and CD-ROM resources, received almost no attention."[15] Despite the early lack of attention to nonprint formats, electronic source instruction has become more prevalent in recent years. In 1993, Powell and Raber found that while 80 percent of instructors taught specific print sources, more than 50 percent also taught electronic sources such as online databases and CD-ROMs.[16] Later work by Hsieh-Yee found that the instruction of electronic sources was no longer performed exclusively in traditional reference courses.[17] Hsieh-Yee's survey found that electronic sources were taught in 293 LIS classes, of which only 45 percent were traditional reference courses. As electronic information sources become more ubiquitous and easier to use, reference education has increasingly gravitated toward them.

Contemporary methods for teaching students about reference sources have not been well documented; nevertheless, some historical information on this topic is available. For example, descriptions of instructional methods in the Williamson Report of 1923 include lectures about reference books, distribution of lists of reference questions, and class discussions of methods of finding answers to those questions.[18] Furthermore, according to Rothstein, until the middle of the twentieth century, guides to reference books dominated the curriculum.[19] Richardson Jr. expands on the idea of a source-based reference curriculum by looking at historical reference textbooks published from 1890 to 1990 and the role of textbooks as signifiers of a reference instruction paradigm.[20] He also documented teaching methods used by reference instructors between 1890 and 1953, including discussion of specific reference sources, discussion augmented by "practical [reference] problems," discussion of search techniques for general source types, and learning "by doing."[21]

Richardson Jr.'s technique of assessing source instruction by looking at reference textbooks can be used to assess the kinds of source instruction favored by current reference instructors. Two texts are primarily used for reference instruction, Katz's *Introduction to Reference Work: Basic Information Services* and Bopp and Smith's *Reference and Information Services: An Introduction*.[22] Both of these volumes categorize reference sources by type, with examples of specific sources included within each type. Further, both texts have chapters devoted to electronic reference sources but also include mixed coverage of print and electronic sources in the chapters dealing with various types of sources (for example, dictionaries, encyclopedias, indexes). It might be assumed from this coverage that reference students are exposed to the names of reference sources and the types of information covered in those sources. However, this text-mediated approach decontextualizes the sources and does not permit visual, tactile experience of those sources that might be obtained in the classroom or through directed exploration of sources. LIS students have a variety of learning styles and while some will find a text-based presentation of reference sources adequate, others will "need the opportunity to work actively" with those sources to learn them.[23]

In 1982, Summers noted some of the teaching methods used by reference instructors at that time, including reference simulations and case studies.[24] Jackson suggests comparison of print and electronic versions of the same source as a teaching method in 1989.[25] In 1994, Powell and Raber documented frequently used methods such as lecture, discussion, demonstration, online searching, self-guided study, and treasure hunts.[26] Hsieh-Yee found that preferred methods for teaching electronic sources included lecture, hands-on experience, and demonstration.[27] However, these studies have mentioned reference source instruction in passing, not as a specific focus of the research. Further, most of the documentation of reference source instruction was conducted in the pre-Web era. A more formal study of current reference source instruction methods, specifically examining methods used for print and electronic sources, is called for.

## METHOD

This exploratory study was designed to provide practical information about how the use of reference sources is taught to future librarians studying in LIS education programs. To study the instructional methods used, the authors created a Web-based survey instrument (reproduced in appendix A), searched LIS program Web sites for current reference instructors, and invited those instructors to share their instructional methods. The survey consisted of six closed-ended questions about methods used in individual reference courses taught by the survey respondents. These closed-ended questions asked about percentage of time the respondents spent teaching print and electronic sources and the methods used to present print and electronic sources. In addition to the closed-ended questions, six open-ended questions asked reference instructors to share their most effective teaching strategies and any problem areas they encounter in teaching about reference sources in both print and electronic formats.

A paper version of the instrument was pretested for content, clarity, and presentation by a group of reference instructors at the annual ALISE conference in January 2003. This pretesting procedure also contributed to content validity of the study instrument. While the instruments were not separately tested for reliability, the nature of the majority of the questions (factual reporting of the participants' real experiences) increased the likelihood of high reliability. Pretest feedback was integrated into the final version of the survey instrument and then the survey was converted into an online format.

The target population for this study was instructors of reference courses at ALA-accredited LIS programs in the United States. To identify members of this population, the Web sites of fifty-six LIS programs accredited by ALA at the time of the study were studied. Course

titles in course schedules were used to identify reference-type courses taught within the last three years, or if three years' of schedules were not provided, for as far back as course schedules were available. Some common terms used to identify these courses were: information sources, reference, library materials, and information access. The following are examples of typical course titles:

- for *General Reference Courses*: Information Sources and Services; Reference and Information Services;
- for *Subject-Specific Courses*: Library Materials in Humanities; Social Sciences Reference; Business Information Sources; and
- for *Online Reference Courses*: Online Information Services; Digital Reference.

The complete list included both introductory and advanced courses.

The instructors of reference courses identified on the Web sites were the accessible research population for this study. The process of population identification has some obvious limitations; for example, instructors may have been overlooked due to a lack of course schedules' availability on the Web or due to a misleading title for an otherwise reference-oriented course. However, it was felt that this approach allowed the identification of a high percentage of practicing reference instructors while avoiding those not currently involved in reference instruction.

After identifying the study population, instructors' contact information was acquired from the schools' Web sites or by calling the schools directly. E-mail invitations to participate in the study were sent to a total of eighty-six individuals from forty-eight institutions. Eight schools' Web sites did not provide sufficient information to identify reference instructors. The accessible population was narrowed to seventy-eight participants because four e-mail addresses had permanent delivery errors and four individuals responded that they did not teach reference courses.

The first invitation for study participation produced twenty-seven returned surveys, while a follow-up e-mail garnered another twenty, for a total of forty-seven surveys (60 percent response rate). Seven surveys were found to have technical errors and had to be excluded from the data set. As a result, the study data were provided from forty reference instructors from twenty-eight schools (50 percent of the fifty-six ALA-accredited LIS programs in the United States). Respondents comprised 51 percent of the accessible survey population of seventy-eight, as identified through LIS programs' Web sites.

All respondents answered the six closed-ended questions for each of the reference courses they taught. For these questions, the unit of analysis was the individual course (n=61). The data were tabulated for each course and analyzed using simple descriptive parameters (averages). The six open-ended questions were answered by thirty-one to thirty-six respondents each. For these questions, the unit of analysis was the individual instructor. The content of the answers was analyzed through several coding iterations, allowing for codes and broader coding categories to emerge from the data. The iterative coding procedure followed the format of analytic induction that is commonly used in qualitative research. This procedure is also shared by grounded-theory methodology; however, in contrast to grounded theory, this study used analytic induction as a technique for data analysis and not as a tool for theory development.[28] Whenever possible, respondents' answers were assigned only one category. In a few situations, when determination of a single code was not possible, multiple categories were assigned. Because the data-coding activities were performed jointly, there was no need for separate intercoder reliability evaluation.

## FINDINGS

The forty participants in the survey reported teaching a total of sixty-one unique reference courses. Of those courses, thirty were general reference, twenty-two subject-specific, and nine dealt with electronic reference sources. Of the thirty general courses, twenty-eight focused on basic reference and only two on advanced reference. Areas covered in the twenty-two subject-specific courses included humanities (five courses), health sciences (four), business (four), social sciences (three), science (three), and government documents (three). Among the electronic reference courses, seven were devoted to general electronic sources and two were subject-specific, covering business and health sciences. Table 1 provides a summary overview of the types of reference courses included in the study.

Instructors spent more time teaching students about electronic sources than about print sources. As indicated in table 2, across all sixty-one courses, 59 percent of instruction time was dedicated to electronic sources and 41 percent to print sources. Controlling for courses that dealt with electronic sources specifically, the gap between coverage of these two formats lessens. In general reference courses, average time was evenly split between print (50 percent) and electronic (50 percent). In subject-specific reference courses, on average, more time was spent on

**Table 1.** Types of Reference Courses Taught by 46 Survey Respondents

| | |
|---|---|
| **General Reference** | **30** |
| Introductory | 28 |
| Advanced | 2 |
| **Subject-specific Reference** | **22** |
| Humanities | 5 |
| Health sciences | 4 |
| Business | 4 |
| Social sciences | 3 |
| Science | 3 |
| Government | 3 |
| **Online Reference** | **9** |
| General | 7 |
| Subject-specific | 2 |
| N = 61 | |

electronic sources (57 percent) than on print sources (43 percent). Finally, while instructors of online reference courses spent a vast majority of time (94 percent) on electronic sources, some time was still devoted to print sources (6 percent).

## Methods of Teaching about Reference Sources

A list of alternatives was provided and study participants were asked to choose the types of methods they use to present print and electronic sources in each of their reference courses. An open-ended "Other" choice allowed participants to describe additional methods of teaching print and electronic resources. Table 3 shows that on a scale of one to five, the most frequently used instructional method for print sources (3.65) was in-class discussion of reference books led by the instructor, with the assumption that students would peruse them on their own time. Regarding the course type, this method was most frequently reported for both general and subject-specific reference courses. General reference courses included a larger variety of instructional methods for teaching print sources. In contrast, subject-specific courses relied more exclusively (86 percent) on in-class discussion. Not surprisingly, in online reference courses, there was low level of use and low use frequency of all methods of print instruction. Respondents who chose the "Other" category mentioned reproducing reference source pages for their students, issuing assignments involving work with reference sources, creating workbooks or worksheets for student assignments, offering student-led bibliographic instruction sessions, and keeping source journals.

The two most frequently used methods of presenting electronic sources were (1) modeling online searching in the classroom, and (2) discussing searching electronic sources in general terms, with the assumption that students would conduct their own searches at a later time. As shown in table 4, on a scale of one to five, search modeling had the highest average frequency of use in general courses (4.67), subject-specific courses (3.93), and online courses (3.63). However, respondents reported using this method more in general courses than in subject-specific courses. The most prevalently used method for online courses was the discussion method. Responding in the "Other" category, two instructors noted that they demonstrated the search process, which students immediately replicated at their own workstations. Additional teaching methods included having students deliver class presentations of databases, creating scripts to walk students through searching, using workbooks for products such as the Dialog search product, and focusing on static database features such as "help," "how to," and "about" features.

Two of the open-ended survey questions asked about methods used for comparing reference sources. The question about comparison of print resources was answered by thirty-four

**Table 2.** Percentage of Time Spent Teaching Print and Electronic Sources, by Course Type

| Course Type | Average Percentage of Time Spent on Teaching | |
|---|---|---|
| | Print Sources | Electronic Sources |
| All Reference Courses (N=61) | 41 | 59 |
| General and Subject-Specific Reference (n=52) | 47 | 53 |
| General Reference (n=30) | 50 | 50 |
| Subject-Specific Reference (n=22) | 43 | 57 |
| Online Reference (n=9) | 6 | 94 |

**Table 3.** Methods for teaching about print sources.

| | General reference n=30 | | Subject-specific r. n=22 | | Online reference n=9 | | Gen. & Subj.- spec. r. n=52 | |
|---|---|---|---|---|---|---|---|---|
| | % Use | Av. freq. | % Use | Av. freq. | % Use | Av. freq. | % Use | Av. freq. |
| 1. The class meets in the library and compares sources directly | 80 | 2.0 | 59 | 2.08 | 33 | 2.33 | 71 | 2.08 |
| 2. I bring several reference books to class and pass them around | 83 | 2.83 | 55 | 2.25 | 56 | 1 | 71 | 2.51 |
| 3. I use an opaque projector or camera to present the reference books to the class | 73 | 1.40 | 55 | 2.25 | 56 | 1 | 65 | 1.56 |
| 4. I make transparencies or slides of selected pages in the book | 73 | 2.20 | 55 | 2.42 | 56 | 1 | 65 | 2.06 |
| 5. I discuss the reference books in general terms and assume students will peruse them on their own time | 90 | 3.86 | 86 | 3.58 | 56 | 1.8 | 88 | 3.65 |
| 6. Other (e.g., student-led bibliographic instruction sessions, weekly homework assignments, source journals) | 53 | 4.50 | 59 | 3.62 | 44 | 5 | 56 | 3.72 |

**Table 4.** Methods for Teaching about Electronic Sources

| | General Reference n=30 | | Subject-Specific Reference n=22 | | Online Reference n=9 | | General and Subject- Spec. Ref. n=52 | |
|---|---|---|---|---|---|---|---|---|
| | % Use | Av. freq. | % Use | Av. freq. | % Use | Av. freq. | % Use | Av. freq. |
| 1. I teach in a computer lab and have students perform their own reference searches | 63 | 3 | 55 | 2.5 | 89 | 3.25 | 60 | 2.81 |
| 2. I use a computer and projector to model searching in front of the class. | 80 | 4.67 | 68 | 3.93 | 89 | 3.63 | 75 | 3.85 |
| 3. I use slides or screen shots to model stages in the searching process | 67 | 3.2 | 59 | 2.69 | 78 | 2.57 | 63 | 2.39 |
| 4. I discuss searching in general terms and expect students to do searches on their own time | 70 | 2 | 91 | 3.6 | 89 | 3.88 | 79 | 3.39 |
| 5. Other (e.g., immediate student replication of search, workbooks, search scripts) | 50 | 3.33 | 18 | 3.5 | 11 | 5 | 37 | 3.37 |

respondents. The two main categories identified by 38 percent of respondents (thirteen each), were:

- assigning students to complete exercises that require use of multiple sources ("A practice reference question will ask them [students] to find the answer to a question and compare either two sources given or one given and then to chose another on their own."); and
- using the professionally established criteria for reference source evaluation as a base for comparison. ("I use standard evaluation criteria [scope, treatment, format, arrangement, authority, cost, relation to similar works, special features] as a starting point.")

In-class comparison of physical sources and use of source representations (slides, handouts, and transparencies) were reported by only two respondents each. Three respondents shared that comparison of print sources is not what they typically focus on in their reference courses.

The open-ended question about methods used to compare electronic sources was answered by thirty-six respondents. For fifteen (42 percent) respondents, methods for comparison of electronic and print sources were identical. Many instructors (thirteen, 36 percent) also reported using specific evaluation criteria that are similar to criteria applied to print sources (for example, access, content, cost, and organization). Some evaluation criteria were unique only to electronic sources, specifically, comparison of search processes, interface design, and usability issues; these criteria were mentioned by eleven respondents (31 percent). Similar to comparison of print sources, a number of respondents (nine, 25 percent) relied on students to perform exercises on their own and to give presentations. Six instructors (17 percent) mentioned in-class demonstrations and class discussions as a tool of comparison. Two respondents made a specific point that they compare electronic sources with print sources. Finally, for four instructors, comparison of electronic sources was not an important instructional method.

## Most Effective and Most Challenging Aspects about Teaching Reference Sources

Responding to an open-ended question, thirty-five instructors identified methods that they considered particularly effective for teaching about print sources. The majority of respondents (twenty-eight, 80 percent) used hands-on assignments, often combining them with in-class presentations by students. Here is an illustrative example:

> Teaching them in context. I make it a major function of the fieldwork. I don't think it's effective to hand books around to discuss reference "genres" like index, bibliography, biography, etc. You need to really *use these sources* [emphasis added] to understand them. Handling the book isn't enough.

In-class discussion of print sources was reported as the most effective method by six respondents (17 percent), and organized site visits to a library by only three (9 percent).

For the majority of respondents to the open-ended questions (twenty-two, 61 percent), students' hands-on assignments and follow-up presentations were the most effective teaching methods for electronic reference sources. In-class search demonstrations performed by instructors or vendor representatives were a distant second (ten, 28 percent).

Seven respondents (19 percent) commented that the same methods that are effective for print sources also work well for electronic sources. Additional teaching methods, identified by only one or two instructors, included: in-class guided exercises; integration of discussion on print and electronic sources; students' group work; and fieldwork with observation of librarians at work. Two respondents reported that they have not yet found an effective method for teaching electronic reference, as illustrated by the following answer:

> I consider this still to be an open issue for me and for my students. Electronic-resource selection is an ongoing problem. This is an area in which I am always looking for new ways to facilitate learning.

In addition, two open-ended questions asked reference instructors to identify the main challenges they face about teaching reference sources in print and electronic formats. These were answered by thirty-five and thirty-six instructors respectively.

Table 5 provides the complete list of categories for print resources and their frequency distribution in respondents' answers. Most respondents (thirteen, 36 percent) reported challenges associated with some type of access to the sources themselves. The most prominent problem was access to print sources in courses that are completely Web-based:

- "Getting student access. Web-based courses for distance learning students make it impossible to ensure they have access to print resources."
- "Since my class is almost entirely online I hope all students have access to titles I refer to here in their home library. Access to standard titles is usually not a problem, but I cannot assume all students have seen a more unusual title."

Another prevalent category (ten, 28 percent) was the efforts instructors need to invest in making students realize the value of print sources. As one of the respondents explained it, "Nobody wants to deal with paper anymore." Of the responses coded in this category, eight focused on the challenges that instructors face in convincing students that "paper-based reference sources are still valuable; that going to the Web may not be the best strategy." For the remaining five respondents in this category, the key challenge was how to reach the students and keep their interest in developing deeper knowledge of the content:

> Deciding what analogies/examples to use to make the points I wish to make alive and stick in students' minds. Knocking down superficial understanding and "layperson" misperceptions to be able to tackle more sophisticated knowledge.

Additional challenges included selection of which sources to cover in the class (four, 11 percent) and development of sample reference questions (two, 6 percent). Three reference instructors reported that there were no major unique challenges in teaching print sources.

The responses called for a longer list of categories for challenges in teaching electronic sources than for print sources (see table 6). Many instructors identified more than one key challenge in teaching about electronic sources. These answers have been coded with all applicable categories.

Three main categories of challenges for electronic source instruction were:

- development of a deeper knowledge of electronic reference sources, identified by eight instructors (22 percent) ("Students tend to want to search as though using Web search tools such as Google. It can be a challenge to get them to embrace Dialog or other structured database resources.");
- changes in the content and interfaces of the electronic sources (seven, 19 percent) (". . . the vendors change the interfaces pretty frequently so it simply gets a little confusing, especially for the new students, remembering which sources work best for which type of search."); and
- problems with accessibility due to cancellations and lack of availability of more expensive electronic sources (seven, 19 percent) (" . . . in my state there is such a huge discrepancy between the small rural libraries and the large public and college libraries in terms of what is available to use. Many small publics don't have electronic resources at all. It's an economic issue.")

**Table 5.** Challenges in Presenting Print Sources

| Coding Category | # of Responses Coded | % |
|---|---|---|
| Access to sources (in completely online courses, shared access by students) | 13 | 36.11 |
| Convincing students that understanding print sources is important and keeping students engaged | 10 | 27.78 |
| Selection of sources to cover | 4 | 11.11 |
| Promotion of students' deeper knowledge of the subject | 3 | 8.33 |
| No challenges | 3 | 8.33 |
| Development of sample reference questions | 2 | 5.56 |
| Subject-specific problems | 1 | 2.78 |
| **TOTAL** | **36** | **100.00** |

N=36

Additional challenges identified by more than one respondent were problems with technical support such as lab operations, proxy servers, and passwords (five respondents); selection of sources for inclusion in the course content (five); students' uneven preparation for online searching (four); lack of time for in-class demonstrations (three); and lack of search-interface standardization (three). Three respondents stated that they do not face any major challenges because the representatives of online vendors are eager to help with in-class demonstrations. Finally, the issue of keeping the coverage of electronic sources interesting was mentioned by only two instructors.

**Table 6.** Challenges in Presenting Electronic Sources

| Coding Category | # of Responses Coded | % |
|---|---|---|
| Developing deeper knowledge of content and search processes; looking past Google | 8 | 22.22 |
| Future changes in content and interface of electronic sources | 7 | 19.44 |
| Problem with access to electronic sources (cancellations, no access, expensive) | 7 | 19.44 |
| Problems with technical support (labs, proxy servers, passwords) | 5 | 13.89 |
| Students' preparation and uneven search skills | 4 | 11.11 |
| Selection of electronic sources for presentation, keeping up with new electronic sources | 4 | 11.11 |
| No challenges (vendors help, easy access) | 3 | 8.33 |
| More time for explanation of demonstrations | 3 | 5.56 |
| Complexity of interfaces and lack of standardization | 2 | 5.56 |
| Keeping presentations interesting | 2 | 8.33 |
| Other (one response coded per category) | 3 | 22.22 |
| TOTAL | 45 | 102.78 |

N=36

Note: The total exceeds 100 percent because answers from some respondents were coded in multiple coding categories.

## DISCUSSION

The study findings identify the instructional methods applied by LIS reference instructors in teaching about reference sources. In addition, the findings also point out the most effective and most challenging aspects of reference source instruction. In simplified terms, there are two general types of source instruction for both print and electronic reference sources:

1. Discussion about sources, led by the instructor or students reporting on their assignments. Frequently, discussion involves explanation of evaluative elements used for comparison of reference sources; and
2. Use of reference sources, primarily accomplished through students' hands-on exercises. While exercises involving use of print sources happen primarily without instructor supervision and outside of class time, use of electronic sources is frequently demonstrated by the instructor during class time.

In general, students get little in-class experience in handling and using print sources. Instructors expect students to gain application skills outside of class, through exercises and assignments. Instructors also seem to believe that comparison of resources flows better in the context of practical experience in using the sources. This approach avoids the difficulty of in-class demonstrations involving print sources, such as moving books from the library to the classroom or creating representations of print sources in the form of slides, transparencies, or PDF documents.

Overall, the reference instructors in this study reported spending more time teaching about electronic sources than about print sources. They also devote more class time to demonstrating electronic sources than to print sources. One possible explanation for the instructional emphasis on electronic sources is the overall increase in importance of electronic formats in provision of reference services due to proliferation and accessibility. Furthermore, networked access to electronic reference sources eliminates the logistical difficulties for in-class demonstrations that are typically associated with bulky print formats. The portability and accessibility of electronic sources make it effortless to demonstrate their use in the classroom with just a computer, projector, and Internet connection. While instruction for print source utilization is deemed intuitive, and students are presumed to understand basic skills (for example, using page numbers, indexes, and tables of contents), electronic source instruction tends to be process-oriented and focused more on the search process. Instructors therefore make great use of modeling and demonstrating searches.

Many other instructional challenges reported by survey participants can be attributed to the changes in the format of LIS education from in-class, face-to-face instruction to various types of distance education and increased use of electronic reference sources. For example, in reference courses that are offered in a completely online format, students are widely distributed geographically and do not have access to the same collection of reference sources. Online teaching requires adjustments in instructional approaches that count on students' hands-on exercises outside of class time as a prominent method

of resource instruction. Furthermore, instructors teach courses that increasingly deal with nonprint materials but have not developed unique teaching approaches to present those electronic sources. They use many of the same or similar approaches for comparing electronic sources as they have traditionally used for comparing print sources. Some report they find these methods equally effective; however, others say they have not found an effective way to present electronic sources yet. Consistent with these results, this study identified many more challenges for the presentation of electronic sources than for the presentation of print sources.

Future research should address the impact of these other instructional challenges on the ability of LIS education to produce professionals with higher-level thinking skills. Action research in this area should engage students, practitioners, and instructors by allowing all parties to identify challenges, reflect on those challenges, and produce solutions for the problems of source instruction across a professional career. Qualitative research comparing the substance and process of reference source instruction, including rules of use and evaluation, form another potential avenue for understanding how instructors teach and new librarians learn to use reference sources. As LIS courses move from a face-to-face environment to a distance education environment, future researchers might conduct a deeper analysis of effective instructional techniques for various teaching modes. Finally, an additional promising approach to assessing reference source instruction is to place it within the context of the hierarchy of educational objectives (for example, Bloom's Taxonomy of Educational Objectives).[29] This study suggests that deeper understanding of reference sources is a desired objective of instructors; however, the methods they use for instruction may not be the most appropriate for creating that level of understanding. Interviewing instructors and looking at their instructional materials—syllabi, tests, and assignments—will provide richer information than can be obtained by a survey.

## CONCLUSION

This study provided an insight into methods of reference source instruction heretofore lacking in LIS literature and identified a number of successful instructional approaches. These included students' classroom presentations of sources, hands-on assignments, and fieldwork that allow students to work with sources. The study also identified challenges facing reference instructors in the era of distance education and the growth of electronic reference sources. Instructors want their students to develop a deeper knowledge of print and electronic sources, but face difficulties ensuring access to sources, working with technology, and changing interfaces. These challenges may be diminishing the potential quality of education for current students and future practitioners.

How is the field going to address instructors' concerns with reference source education? One option may be a wait-and-see approach, by letting the natural processes of evolution in instructional practice follow their own course. This course of action would likely mean watching a decline in the quality and quantity of print source coverage in reference courses without intervening. The better option might be for reference instructors to initiate discussions about new strategies for reference source instruction in the context of the changing nature of LIS education. These discussions can help establish standards for the instruction of print and electronic sources, which may include a required list of print sources, skills for using electronic reference sources, or source evaluation criteria to be learned. Although RUSA's reference competencies approach this state, they are more concerned with behavior and less with specific source knowledge or skills. Further, this standards approach, identified by Richardson Jr. as *structuralist,* has historically been difficult to maintain due to continual growth of the body of essential sources.[30] Nonetheless, a general consensus among reference instructors as to what print sources students must know would be a useful starting point for planning future reference curricula.

An additional approach may be to take the initiative in developing an instructional tool to facilitate reference source instruction. A tool of this sort might be a shared application to provide access to, demonstration, and comparison of print sources through electronic representations of those sources. A prototype version of such a tool was designed by one of the authors for a subject-specific reference course. An expanded version could include a database with multimedia clips illustrating and comparing online search processes in various electronic sources. This tool could build on Richardson Jr.'s typology of reference sources and their characteristics, but would be oriented toward teaching LIS students how to use these sources rather than assisting librarians in finding sources.[31] To expand this instructional tool beyond source instruction and into generalized reference education, video clips of reference interviews and the question-answering process might be included for instructors to present as case studies for their classes. However, a shared option would require commitment and collaboration among reference instructors from LIS schools and practitioners in a variety of settings, as well as the cooperation of reference source publishers to allay copyright concerns. Pursuing any of these approaches will have repercussions for the reference education of the next generation of librarians. Reference instructors, practitioners, and students must realize that their instructional choices of today will impact the library of tomorrow.

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## APPENDIX A

### Reference Instructor Survey

The Web-based format of the survey prevents full reproduction of the instrument. Content-related survey questions are listed below.

### Course-specific questions:

*These questions were repeated three times to allow instructors to describe multiple courses.*

1. What is the title for this reference or information sources course?
2. Think about the total time you spend teaching about reference sources in this course. What percentage of your time is spent teaching print sources, and what percentage of your time is spent teaching electronic sources?
3. What instruction method do you use for this class?
   - Completely face-to-face, with regular class meetings
   - Face-to-face, with "lab" sessions in the library
   - Live televised broadcast classes at remote locations
   - Web-based, with some face-to-face meetings
   - Other (please explain)
4. Please rank the methods you use to present print sources to this class. Use 1 for the least frequently used method and 5 for the most frequently used method.
   - The class meets in the library and compares sources directly.
   - I bring several reference books to class and pass them around.
   - I use an opaque projector or camera to present the reference books to the class.
   - I make transparencies or slides of selected pages in the book.
   - I discuss the reference books in general terms and assume students will peruse them on their own time.
   - Other (please explain).
5. Please rank the methods you use to present electronic sources to this class. Use 1 for the least frequently used method and 5 for the most frequently used method.
   - I teach in a computer lab and have students perform their own reference searches.
   - I use a computer and projector to model searching in front of the class.
   - I use slides or screen shots to model stages in the searching process.
   - I discuss searching in general terms and expect students to do searches on their own time.
   - Other (please explain).

### General Questions:

1. In a sentence or two, please describe how you compare two or more print sources.
2. What do you find to be your biggest challenge in teaching about paper-based reference resources?
3. What teaching methods or strategies have you found to be particularly effective in teaching about paper-based reference resources?
4. In a sentence or two, please describe how you compare two or more electronic sources.
5. What do you find to be your biggest challenge in presenting electronic-reference resources?
6. What teaching methods or strategies have you found to be particularly effective in teaching about electronic reference resources?