

Reference Source Instruction: A Model for Teaching¹

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Abstract

The ideology of American librarianship places a very high value on librarians' ability to find information and make that information accessible to the public. A broad and deep knowledge of reference sources is one of the facets of a "competent" reference librarian. The study of reference procedures and information sources has consequently been regarded as one of the staples of library and information science (LIS) education.

Our 2004 survey of reference instructors revealed that respondents use a variety of methods to present reference sources to students. Survey results were used to support an exploratory investigation into the frequency of use of various teaching methods for information resources. We used Bloom's Taxonomy of Learning to classify instructional levels, and analyzed types of teaching methods based on their fit within these categories. Final results suggest that much reference source instruction occurs at the lower level, while higher level instruction falls to students to complete outside of class.

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Introduction

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 library and information science (LIS) programs teach library students to use various reference sources in order 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. 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 reference sources use 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 World Wide Web (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 may assist the new educators in determining successful instructional

strategies; it may allow experienced reference instructors to understand the shared concerns of reference instruction. However, there is limited information available about current practices in reference source instruction. To expand upon this information, we conducted an exploratory survey of reference instructors at American Library Association (ALA) accredited LIS programs, to determine the teaching methods they use to present reference sources to their students. We then analyzed results from the perspective of Bloom's Taxonomy of Educational Objectives, to determine the level and depth of source instruction in reference education.

Relevance of Bloom's Taxonomy in Reference Education

Bloom's Taxonomy of Educational Objectives has been used and tested extensively since its development in the early 1950s. The Taxonomy is a hierarchical presentation of learning objectives, going from simple to abstract concepts. Students at the *Knowledge* level have command of basic factual information; they can name a reference source or list the features of that source. At the *Comprehension* level, students can explain how specific facts are related. They can describe multiple sources and summarize the content of those sources. Students at the *Application* level can relate their knowledge to the real world. A student at this level can choose an appropriate source and use that source to answer a question. A student at the *Analysis* level is able to compare several sources and contrast their coverage of particular topics. At the *Synthesis* level, students can create new knowledge, predicting how useful a source might be with a selected audience, planning reference services, or designing interfaces. Finally, students at the *Evaluation* level are able to judge between multiple sources, recommend particular sources over others, and justify their selections to others. These objectives were viewed as hierarchical and cumulative – that is, it was necessary to have knowledge before one could comprehend

relationships within that knowledge, necessary to comprehend how knowledge works before one could apply that knowledge, and so forth.

LIS instructors can use Bloom's Taxonomy in order to determine how closely their activities mesh with standards and objectives for their graduates. Using a revision of Bloom's Taxonomy, Lorin W. Anderson suggests a strategy for aligning curriculum with expectations.¹ Anderson suggests three fundamental components of the educational process: Standards or Objectives, Instructional Activities and Materials, and Assessments and Tests. These components are mapped to their own individual Taxonomy Table, and the three resulting tables compared. "Complete alignment is evidenced when there are common cells included on all three completed Taxonomy Tables."² Using information collected from a survey about reference source instruction and the Competencies statement compiled by the Reference and User Services Association, we will suggest areas of reference source instruction that need improvement and the strategies for their improvement.

Method

We used a Web-based survey to collect reference instructors' feedback about their teaching methods applied in covering reference sources. The survey instrument consisted of six closed-ended questions about the reference courses taught by the survey respondents. These 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 problem areas they encounter in teaching about reference sources in both print and electronic formats.

The theoretical population for this study was instructors of reference courses at ALA-accredited LIS programs. To identify members of this population, we visited the Web sites of 56 LIS programs accredited by the ALA at the time of the study. We used course titles in course schedules to identify reference-type courses. Some common terms used to identify these courses were: information sources, reference, library materials, and information access.

We solicited instructors' contact information 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 86 individuals from 48 institutions. By academic rank, these individuals included 18 professors, 29 associate professors, 17 assistant professors, 3 instructors, and 19 adjuncts. The accessible population was narrowed to 78 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 27 returned surveys, while a follow-up e-mailing garnered another 20, for a total of 47 surveys (60% return 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 40 reference instructors from 28 schools, meaning that the actual sample size was 51% of the accessible survey population, which suggests high external validity. All 40 study participants answered the six closed-ended questions, while the open-ended questions were answered by between 31 and 36 respondents each.

Numerical data were tabulated for each course reported by survey participants and analyzed using simple descriptive parameters (averages). We analyzed the content of answers to open-ended questions through several coding iterations, allowing for individual codes and broader coding categories to emerge from the data itself. The unit of study for the content

analysis was the entire answer to the open-ended question. We performed the data coding collectively, eliminating the need for separate intercoder reliability evaluation.

Once we completed the initial analysis of the survey data, we re-analyzed the findings using Bloom's Taxonomy. Teaching methods were assigned to various places in the Taxonomy through a content analysis. Reference instructors indicated using a variety of teaching methods, some suggested by the survey and others written in by the instructors themselves. For pre-designated teaching methods (such as "in-class discussion of sources" or "lab work in library"), we mutually determined the appropriate placement for all answers in that category. Placement for write-in teaching methods was negotiated between the researchers based on instructors' descriptions. RUSA's source-related professional competencies were also broken down into these categories, and compared to instructors' teaching activities. From a total of 99 competency strategies, 15 were identified as being exclusively source-oriented, and these were plotted in the Taxonomy.

Findings

The 40 participants in the survey reported teaching a total of 61 unique reference courses. Of those 61 courses, 30 were general reference, 22 subject-specific, and 9 dealt with electronic reference sources. Of the 30 general courses, 28 focused on basic reference and only 2 on advanced reference. Areas covered in the 22 subject-specific courses included humanities (5 courses), health sciences (4), business (4), social sciences (3), science (3), and government documents (3). Among the electronic reference courses, 7 were devoted to general electronic sources and 2 were subject-specific, covering business and health sciences. Table 1 provides a summary overview of the types of reference courses included in the study.

Methods of teaching about reference sources

We asked study participants to identify from the list of provided choices all the types of methods they use to present print and electronic sources in their reference course. Additional open-ended questions asked respondents to describe the method of teaching print and electronic resources. Table 1 below shows that the most frequently used instructional method for print sources (3.65) was in-class discussion of reference books by the instructor with the assumption that students would peruse them on their own time. 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, student-lead bibliographic instruction sessions, and keeping source journals.

The two most frequently used methods of presenting electronic sources were to model online searching in the classroom and to discuss searching electronic sources in general terms, with assumption that students would conduct their own searches at a later time. As shown in Table 2, search modeling had the highest average frequency of use in general (4.67), subject-specific (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.

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 34 respondents. The two main categories identified by 38% of respondents (13) each, were:

- Assigning students to complete exercises that require use of multiple sources.
- Using the professionally established criteria for reference source evaluation as a base for comparison.

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 36 respondents. For 15 (42%) respondents, methods for comparison of electronic and print sources were identical. Many instructors (13, 36%) also reported using specific evaluation criteria that are very similar to criteria applied to print sources (e.g., access, content, cost, and organization). Some evaluation criteria were unique only to electronic sources, in particular comparison of search processes, interface design, and usability issues; these criteria were mentioned by 11 of respondents (31%). Similar to comparison of print sources, a number of respondents (9, 25%) relied on students to perform exercises on their own and to give presentations. In-class demonstrations and class discussions, as a tool of comparison, were mentioned by 6 (17%) of instructors. 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, 35 instructors identified methods that they considered particularly effective for teaching about print sources. The majority of respondents (28, 80%) used hands-on assignments, often combining them with follow-up in-class

presentations by students. In-class discussion of print sources was reported as the most effective method by 6 respondents (17%) and organized site visits to a library by only 3 (9%).

For the majority of respondents to the open-ended questions (22, 61%), 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 (10, 28%). Seven respondents (19%) commented that the same methods that are effective for print sources also work well for electronic sources.

An additional 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 35 and 36 instructors respectively. Most respondents (13, 36%) reported challenges associated with some type of access to the sources themselves. The most prominent problem within this coding category was access to print sources in courses that are completely Web-based.

Another prevalent category (10, 28%) was related to 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, 8 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 5 respondents in this category, the key challenge was how to reach to the students and keep their interest in developing deeper knowledge of the content, as illustrated by the following response:

"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."

Three main categories of challenges for electronic source instruction were:

- Development of a deeper knowledge of electronic reference sources, identified by 8 instructors (22%).
- Changes in the content and interfaces of the electronic sources (7, 19%).
- Problems with accessibility due to cancellations and lack of availability of more expensive electronic sources (7, 19%).

Additional challenges identified by more than one respondent were problems with technical support such as lab operations, proxy servers and passwords (5); selection of sources for inclusion in the course content (5); students' uneven preparation for online searching (4); lack of time for in class demonstrations (3); and lack of search interface standardization (3). 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.

Discussion

Our study findings have identified the instructional methods applied by LIS reference instructors in teaching about reference sources and have also pointed 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 types of reference sources:

1. *discussion about sources*, which is led by the instructor or students reporting on their assignments. Frequently, discussion involves explanation of evaluative elements used for comparison of reference sources.

2. *use of reference sources*, which is 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 of 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 a form of slides, transparencies, or PDF files.

Table 3 presents methods of reference source instruction analyzed in the broader context of educational objectives. Reference instructors' focus on definition, description, and examination of reference sources addresses the *knowledge* level, which is the first and lowest stage in Bloom's Taxonomy. The instructors facilitate students' *comprehension* by comparison of reference sources, and by teaching students about the standard criteria for reference source evaluation. The use of these methods is relatively common across reference education. By using the class time for description (for print sources) and search modeling (for electronic sources) as the preferred methods of source instruction, reference instructors are clearly focused on establishing a strong knowledge and comprehension base for their reference students.

In the context of reference services, *application* as the third stage in Bloom's Taxonomy, means that students are capable of applying their knowledge of references sources to find answers to reference questions. Reference instructors extensively rely on hands-on assignments as a very effective method of source instruction. In these assignments, which are typically

completed in libraries and outside of class time, students are provided with practice reference questions with closed-ended or known answers. In working with specific sources, students learn to identify the best sources for specific reference questions.

The remaining three stages of Bloom's Taxonomy (*analysis, synthesis and evaluation*) are usually identified as higher-level educational objectives. They refer to students' capabilities to see patterns, make inferences, generalize, and explain the information in some domain of knowledge. On the highest level of mastering reference resources the students need to recognize what types of questions can be answered with a specific type of source; they need to determine which among competing sources will most likely answer the question; they need to articulate the strengths and weaknesses of reference sources and explain why they have chosen a particular source. Instructors indicated many methods they used to acquaint students with these levels: comparison of specific elements between sources, preparation of information resources and resources, and extensive evaluation of sources. Despite these techniques indicated by some reference instructors, most instructors used lower-level instructional methods in their reference classes. Nevertheless, study respondents identified as an instructional challenge the desire to promote students' deeper knowledge of print and electronic sources.

This is a matter of concern not only for instructors but for currently practicing and new reference professionals. RUSA's document on reference competencies assumes knowledge, comprehension, and application on the part of the practitioner.³ RUSA strategies are primarily clustered at the higher taxonomy levels. Though some strategies, such as reading reviews and keeping current, were placed at the *Knowledge* level, the majority of strategies were found at the *Analysis, Synthesis, and Evaluation* levels. The assumption underlying Bloom's Taxonomy is that each level supports the ones above it. RUSA calls for the reference librarian to achieve

higher-level objectives of assessment, construction, and formal critique of reference sources. LIS education does not always meet these goals.

Conclusion

Bloom's Taxonomy was originally designed to represent a hierarchy of learning objectives, arranged by complexity. The hierarchy of reference source instruction levels presented here works from that original purpose. Description of a source is relatively simple, application more complex, and evaluation of multiple sources within a specific context is more complex still. However, reference librarians are called upon to perform these tasks every day. LIS students need a thorough background in the use and evaluation of reference sources, just as they need a thorough background in reference service.

Table 1. 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	53	4.50	59	3.62	44	5	56	3.72

Table 2. Methods for teaching about electronic 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. 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	50	3.33	18	3.5	11	5	37	3.37

Table 3. Reference source instruction and RUSA competencies evaluated through Bloom's Taxonomy.

	LIS Education	RUSA Competencies & Standards
Knowledge	<p>P. I discuss reference books in general and assume students will peruse sources on their own time.</p> <p>P. I bring several reference books to class and pass them around.</p> <p>P. I use an opaque projector or camera to present the books.</p> <p>P. I make transparencies or slides of selected pages.</p> <p>E. I discuss searching in general terms and expect students to do searches on their own time.</p> <p>E. I use slides or screen shots to model stages in the search process.</p> <p>E. I use a computer and projector to model searching in class.</p> <p>E. "Students are expected to identify and examine the 'how to,' 'help,' and 'about' materials for the electronic resources."</p>	<p>K.E.4. Keeps current on new information resources</p> <p>K.E.5. Reads reviews in both print and online media</p> <p>EV.IR.3. Identifies any bias or point of view in an information resource</p> <p>EV.IR.5. Reads reviews of new information resources</p>
Comprehension	<p>P. The class meets in the library and compares sources directly.</p> <p>P. "Questions about the features and functions of tools to guide students on examining the resources."</p> <p>P. "I discuss forms and formats; students study characteristics using a set of questions as a focal point."</p> <p>E. "I have developed a series of self-grading exercises which require students to explore a variety of electronic resources...."</p> <p>E. "I demonstrate tools, searching, and then they have an assignment to work through."</p>	<p>EV.IR.2. Determines the authority of these resources.</p>
Application	<p>P. "We design assignments that will bring the student to the resources and explore them."</p> <p>P. "In class activities incorporating the use of print resources to find answers to reference questions."</p> <p>P. "Students answer a set of reference questions each week that requires a variety of sources."</p> <p>P. "Practice reference questions get them into the works."</p> <p>E. I teach in a computer lab and have students perform their own searches.</p> <p>E. "I use in-class activities incorporating the use of electronic resources to find answers to reference questions."</p> <p>E. "...workbooks have search exercises...."</p> <p>E. "Students are given exercises in the use of sources."</p> <p>E. "Assignments are given that cover the searching of various types of databases"</p>	<p>A.C.1. Uses electronic and printed media...</p>
Analysis	<p>P. "Students compare information on specified topics in different sources."</p> <p>P. "We compare application techniques, content, and interfaces of different resources."</p> <p>E. "Students ... present a database in each subsequent class section."</p> <p>E. "Class participates in discussion board activities to compare</p>	<p>A.R.2. Analyzes information sources recommended to users...</p> <p>M.E.4. Identifies the strengths and weaknesses of the products</p> <p>EV.IR.1. Assesses the content</p>

	their experiences.”	of resources in the print and virtual collections for accuracy and currency.
Synthesis	<p>P. “Students provide short BI presentations of various source categories.”</p> <p>P. “I have teams put together an electronic resources report and bibliography for a discipline or sub-discipline in the humanities.”</p> <p>E. Using Internet Public Library, “students learn ... and practice ‘real world’ but mentored reference.”</p>	<p>A.O.2. Creates bibliographies, book talks, etc.</p> <p>A.O.6. Compiles and maintains information about community resources</p> <p>A.C.2. Synthesizes a variety of information sources</p>
Evaluation	<p>P. “For some assignments, students are required to review certain reference texts and evaluate them.”</p> <p>E. “Students conduct research interviews with faculty members and doctoral students, and perform extensive online searching for them based on requests they made.”</p>	<p>M.E.6. Decides what reference services and products will be retained...</p> <p>EV.IR.4. Evaluates new information sources....</p> <p>EV.IR.6. Writes and publishes reviews of new information resources</p>

¹ Lorin W. Anderson, “Curricular Alignment: A Re-Examination,” *Theory into Practice* 41, no. 4 (Autumn 2002):255-260.

² Anderson, “Curricular Re-Alignment,” 258.

³ RUSA, “Professional Competencies,” 294-295.