Research Strategies: Bibliographic
Instruction for Undergraduates

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BIBLIOGRAPHIC INSTRUCTION LITERATURE IS filled with discussions of all aspects of the questions surrounding the nature of education in research strategies. Controversy about theory and practice exists concerning what level of student should be taught, exactly what should be taught, what methods should be used, and who should do the teaching. In the following discussion of these issues, substantive examples will be presented from the social sciences, with the assumption that the social sciences illustrate problems similar to those arising in the humanities, the biological sciences, the natural sciences, and some professional fields.

From the outset, it is necessary to understand that there is no clearly defined concept of research strategies—or search strategies, the more commonly used designation. Generally, it is used to refer to some sort of systematic approach to information. That the term is loosely used is reflected in the fact that one author employs it in reference to a specific tool (as in directions to read introductory material for a volume or to examine the index),[1] while another employs it in reference to an ordering of materials in the sequence of greatest perceived usefulness (as in the statement, "reference tools will be presented in search strategy order").[2] McInnis uses the term *research strategies* in a quite different

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way in his explication of "structured inquiry" (an approach to discipli-
nary literature based on knowledge of the substantive and bibliographic
dimensions of scientific literature).[3] In Lockwood's useful bibliography
on library instruction, "search strategy" is a subdivision of "Teaching
Specific Tools."[4]

Level of Student

The audience for instruction in research strategies at the under-
graduate level generally is considered to be upper-division students who
have selected a disciplinary area of study. Werking articulated the
reasons for this emphasis:

> First, it is probably at this point in an undergraduate's education that
> she will develop most as an independent learner. Second, such
> instruction can do a great deal to show students the personal nature of
> the research process and help them see themselves as contributors to
> that process. Finally, instruction to subject majors is a good method
> of educating faculty about bibliographic techniques they may find
> useful, both for themselves and for their other students.[5]

In a contrasting approach, Knapp utilized research work on student
subcultures on college campuses to suggest that of the four groups Clark
and Trow have distinguished (academic, nonconformist, collegiate,
and vocational), nonconformists might be the subculture "worth court-
ing."[6] Palmer outlines the fallacies of elementary, freshman-level
library instruction, while other writers assume that basic library orien-
tation has been provided at earlier stages of a student's academic career.[7]

Clearly, selection of target audiences might depend on the meaning
various writers attach to "search strategy." If it means an orderly expo-
sure to a particular reference tool or a systematic search of reference
sources, it might be appropriate to any level of instruction. If it means
an inquiry technique that develops from exploration of the intercon-
nections between the substantive and bibliographic characteristics of a
discipline, it will be taught more appropriately at the upper-division
levels.

Content of Instruction

The most interesting and crucial questions about search strategies
surround the issue of what is to be taught. Two aspects of the problem
will be explored: whether to teach sources or process, and whether to
teach library models or disciplinary models of the literature.

The basic issues in the first question, whether to teach sources or process, were explored by Swift, Winn and Bramer. They described a model which assumes that "what the document is 'about' is the basis of the search,"[8] and they point out that "aboutness" is the basis for the construction of many major reference tools. It forms the basis for the source-based approach. However, the authors went on to argue that research requirements in the social sciences demand a "multi-modal approach"[9] in which there are many ways of categorizing documents besides by subject. They distinguished their proposed model from the "aboutness" model:

> Whereas the "aboutness" model posits a process of matching documents and search requirements as the means by which searchers trace material that will help them, the logic of our argument suggests that searching in the social sciences must necessarily be an open-ended process....Our general conception is one of searchers differentially interacting with the documents in the system. This is in strong contrast to the relatively mechanical process of matching which is assumed by the "aboutness" approach.[10]

Emphasis on teaching sources is intimately tied to the fact that most library instruction is necessarily offered by means of one-hour lectures and workbooks which are appropriate for traditionally structured curricula. Time is a particular constraint in course-related instruction, which is usually initiated by the invitation of a faculty member. It requires the librarian to use a limited period to address the specific needs of students in a course. Students are given exact information about sources they need to use to complete a course assignment. Kirk defined this technique as "the 'response' approach."[11] In such a process, while students may be able to complete particular assignments, there is little indication that they will learn patterns which will be of use when they face another library information problem. Kirk described response instruction and then proceeded to explain the Earlham "bibliographic" approach. Earlham's pattern modifies the source approach by ordering the listing of sources into a systematic search process which leads the students from general background sources to bibliographies, the card catalog, and periodical indexes.[12]

The workbook in library use instruction was first developed in the early 1970s at the University of California at Los Angeles[13] and usually is based solely on the source approach. Evidence of a metamorphosis can be found in a few workbooks which include limited attention to the order in which information is presented and to the principles that may be applied to the process of searching for information. At the University

of Wisconsin-Parkside, the workbook used to teach library skills to all students as a graduation requirement includes a final term paper assignment which is intended to assist the students in integrating the individual sources used in earlier exercises.[14] Going beyond this and other such modifications, the workbook developed for use with the College of Education Bibliographic Instruction Project at the University of Toledo completely reverses the usual emphasis. It specifically attempts to teach the process of searching for information and uses exercises with particular sources as illustrations of the search process.[15]

The search process used at the University of Toledo is similar to the generalized model provided by Benson and Maloney. Their model suggests "two 'givens'—a *system* and a *query*."[16] The system is characterized by type (single tool, collection, or network), language or vocabulary, and limitations of the system. A query may be for a known item or a subject and is also characterized by language or vocabulary constraints and preferred limitations. The search process provides a "bibliographic bridge" between the query and the system, and includes the following steps:

1. Clarify the question (the interview).
2. Establish search parameters based on the interview.
3. Identify system(s) to be searched.
4. Translate (index) the query in the language of the system.
5. Conduct the search.
6. Deliver the information.[17]

While the Benson and Maloney discussion centered on the search process as part of reference delivery, the University of Toledo workbook places the student in the position of specifying the question, limiting the search, translating the natural language of the question into the specialized language of the selected system, and completing the process.

Inherent in these attempts to blend sources and search process is this question: is it necessary specifically to teach students the process of searching for information, or will they learn it implicitly through a patterned introduction to sources? The answer from the disciplinary departments is a resounding "no" on both sources and process, judging by the relative paucity of articles about bibliographic instruction appearing in the disciplinary literature sources listed in the Lockwood bibliography.[18] Additional evidence from an informal survey of teaching materials in sociology reveals the occasional reference to library sources, but never to the process of searching for information, and instruction in library use is not mentioned.[19] The strongest answer to

the question emerges from the challenging intellectual presentations by Knapp, Freides and McInnis, with echoes from other writers.[20] These authors affirmed that students must be specifically taught the substantive and bibliographic structures of a discipline, and from that knowledge, appropriate processes for searching for information in a discipline may be fashioned. Knapp, based on her experience at Monteith College, suggested "that high-level library competence calls upon a wide range of knowledge and skills....This level of competence is not just 'picked up' by the bright student. It must be taught."[21]

Knapp, Freides and McInnis each hypothesized the mating of a discipline's bibliographic structure and substance in different ways. Knapp perceived bibliographic organization as a system of "ways" related to the process of searching:

> The term "way" in the sense of "method" implies knowledge and understanding of the interlocking organization of the library and scholarly communication....Knowing the way to use the library ....means, on the one hand, understanding that the nature and degree of bibliographic control characteristic of any discipline is likely to depend on the maturity of the discipline, the extent to which its work is cumulative, the economic support society is willing to give it, the social structure in which its practitioners work. It means appreciating, on the other hand, that there are communication needs and purposes common to all disciplines. It means knowing and being able to use the tools of scholarly communication, the tools of library organization, and the tools which connect the two.[22]

Further, Knapp was convinced "of the feasibility of illustrating the same key concepts and processes with a variety of experiences and materials," if "concepts and processes [are emphasized] rather than specific library tools."[23]

Freides suggested that "the bibliographic tools of scholarship may be viewed as comprising a system whose structure and organization parallels that of the scholarly literature."[24] She referred to "literature searching as tuning in" to this system so that the student can experience an approach which combines the processes of learning about a subject with the process of searching.[25]

McInnis has presented by far the most comprehensive and complex description of the "social-scientific literature...[which] comprises two main structural components: substantive structure and bibliographic structure. In retrieval, researchers seek either substantive or bibliographic portions of these structures, or some combination of both, associated with a given field of inquiry."[26] McInnis further elaborated the specific role of reference works within the "substantive-bibliographic continuum":

By depicting reference materials simultaneously as functional neces-
sities and as artificial constructs designed to order scientific literature
in logical, coherent arrangements, the cognitive function of reference
materials becomes more apparent. That is, by setting forth these
relationships in a perspective that demonstrates concretely what is
unconscious, or at best, only vaguely perceived, the function and
structure of reference materials come to be viewed as keys to more
explicit and direct modes of thought and action in developing
research strategies.[27]

McInnis suggested that "by employing such a perspective in library
instruction programs, reference works will be more deeply embedded in
the epistemological foundations of the literature to which they are
related....Literature searching will be made an intrinsic part of inquiry
and will not be regarded as an extraneous task."[28]

As indicated above, in addition to the question of whether to teach
sources or process, a second "content of instruction" issue addresses
whether to teach library models or disciplinary models of the literature.
Library models of the literature are based on individual reference tools
which are developed on an ad hoc basis in response to particular needs.
McInnis echoed Freides in suggesting that: "not occasionally chaotic,
unpremeditated policies and whimsy are responsible [for the produc-
tion of reference books]. Reference librarians often find that sources
providing substantive or bibliographic information are fragmented and
give uneven coverage of a given field."[29] Therefore, if instruction pro-
vided to the user is based on the library organization of literature in a
particular field, the users "frequently discover obvious gaps in the array
of reference works in an area of inquiry," leading to uncertainty and
frustration.[30]

On the other hand, since the inception of citation indexes, it is
possible for the student to mimic the inquiry style of practitioners in a
discipline. Typically, practitioners "1) locate a few key works, perhaps a
specialized bibliography, and certainly a review article if at all possible;
2) find other works cited in footnotes and bibliographies, and put
together a core bibliography; 3) use citation indexes to update the
bibliography; 4) consult recent issues of the most relevant journals,
using either the journals themselves or *Current Contents;* 5) consult
Forthcoming Books."[31] Reference tools become important adjuncts to
the search process, but the logical thread of the search is maintained
within the substantive structure of the discipline. The user perceives the
integration of substantive sources and bibliographic sources and the
mutually supporting disciplinary and library systems.

The issue of the library literature model versus the disciplinary

literature model does not revolve around merely a matter of preferences. Kaplan's seminal discussion of the research process distinguished "logic-in-use" and "reconstructed logic."[32] "Logic-in-use" describes the pattern of thought that informs the actual research process, while "reconstructed logic" conveys the revised logical sequence. The literature search sections of research reports always present reconstructed logic, thereby providing an idealized picture of the logical pattern of the search process. Since reference tools are themselves products of the process of reconstructed logic, it is not surprising that dependence on them by librarians who teach the research process causes some estrangement from the teaching faculty, who in their classes and personal research follow the pattern of logic-in-use. Kaplan suggested that "a great deal hinges on whether science is viewed as a body of propositions or as the enterprise in which they are generated, as product or as process."[33] This suggests the idea that the traditional library model based on a process of reconstructed logic is appropriate for viewing science as product; however, a different library model based on logic-in-use is appropriate if science is viewed as process. He further explained that: "the great danger in confusing the logic-in-use with a particular reconstructed logic, and especially a highly idealized one, is that thereby the autonomy of science is subtly subverted. The normative force of the logic has the effect, not necessarily of improving the logic-in-use, but only of bringing it into closer conformity with the imposed reconstruction."[34] From a disciplinary perspective, to achieve intellectual compatibility and efficiency, search strategies can and should be isomorphic by grounding the process in logic-in-use, even though the actual content of materials retrieved in the search process is in the form of reconstructed logic.

More specifically, there are at least two reasons for resolving the tensions described above in process-oriented instruction which utilizes a disciplinary literature model. First, the model selected for instruction may be related to the ultimate success of the instruction, both in terms of motivation to learn and in retention of knowledge. If instruction is offered when students have made a decision to study a particular subject matter, and if bibliographic instruction can both mirror and extend the research process as taught in the classroom, motivation to deal with library instruction should be increased.[35] Furthermore, teaching a general conceptual framework may increase the likelihood of retention of knowledge, as well as increase the transferability of knowledge. For instance, Smalley outlined Jerome Bruner's description of the learning process and concluded that "retention of information, transferability of

what has been learned to new situations, and evaluative skills, all flow from conceptual mastery of underlying principles."[36]

A second reason for encouraging process-oriented instruction involves the fact that the profession is just beginning to discuss the implications of on-line search services for assisting an ever-expanding body of users as they tackle myriad projects.[37] This will extend, eventually, to concern over ways in which data base searching can be logically incorporated into instruction in search strategy. If a source-oriented approach continues to dominate the field, data bases will become simply another source, or duplicates of existing sources, only distinguished by unusual format and cost. On the other hand, if an approach based on both the process of searching for information and the substantive and bibliographic structure of literature is developed, data base searching may be more logically incorporated into bibliographic instruction. For example, the computerized query analysis system at the University of Denver is designed for sociology students who have little knowledge of the library. The system is intended to: "provide linkages among the language of the student, the conceptual terminology of sociology, and the classification descriptors used by reference librarians and professional indexers and abstractors. Students are thereby aided in focusing their research questions and in identifying appropriate library reference tools."[38] This system is a mechanical means of achieving two steps in the search process: translation from natural to technical language, and identification of the system to be searched. In addition, it allows the student to use logic-in-use as the searching strategy.

Methods Used to Teach

In the bibliographic instruction literature, attention to methods has focused on "how-to-do-it" exchanges.[39] Earlier in this paper it was noted that time constraints, rather than the nature of the material to be taught, have largely dictated the choice of teaching method. Smalley noted Henning's 1971 comment on the lack of "general principles of library instruction"[40] and Farber's 1974 observation of the lack of "agreement on the educational theory behind library instruction."[41] Smalley highlighted the importance of working toward such development of theory:

> An understanding of principles and methodology would set the intellectual structure within which we could begin to think about generating effective and creative instructional programs. Full and probing discussion of the bases on which we build these programs would yield

a context for exchanging information about specific programs we
have individually developed. In sum, if we are to be taken seriously as
teachers, then we must ourselves take seriously the process of
teaching.[42]

Certainly, attention to the teaching process and to complex search-
ing patterns and literature structures will ultimately require additional
instructional time. This may lead to more efforts to implement
curriculum-based rather than course-based library instructional pro-
grams, and it may well enhance the rationale for separate credit courses
in bibliographic instruction. A movement toward curriculum-based
programs may be congruent with other current developments and theo-
retical proposals in higher education. For example, the increased atten-
tion to general educational needs has been marked by several programs
with new, wider curricular orientations, and the administrative reor-
ganization of college and university structures into larger groupings of
academic disciplines has been proposed.[43]

The products of the instructional experience will likely change as
teaching content changes. Such changes would be supported, if not
initiated, by faculty who have long lamented the limitations of the
classic term paper. For example, various techniques for displaying the
information the student gathers about the structure of a discipline have
been developed[44] and may only need imaginative refinement for general
instructional use. While such change will occur, certainly it is unlikely
that standbys like printed guides will disappear. To support the "struc-
tured inquiry" approach he advocates, McInnis provided extensive
samples of printed guides that support instruction in the technique.[45]

Who Should Teach

Any discussion about who should assume the instructional role in
bibliographic instruction must be informed by the decisions about what
is to be taught. By the conventional standards of the literature model
based on library sources, user study after user study has demonstrated
the teaching faculty's general incompetence to use the library.[46] On the
other hand, no study documents librarians' abilities to use or explicate
search patterns that find favor with the disciplinary practitioners. In
other words, librarians may be very competent to teach a library model
of literature which may not be in favor with the faculty, and faculty may
be very competent to teach logic-in-use strategies which appear hope-
lessly unsystematic to librarians. This is not to say that historians,
philosophers, biologists, and sociologists have not been found who will

speak to bibliographic instruction librarians and encourage them in their selected tasks.[47] Certainly, there is agreement that the American professoriate is no more imbued with theoretical knowledge of the teaching process than is the American library profession.[48]

Within the library profession itself, there is considerable uncertainty about who should assume the instructional task. Katz, Schiller and Wilson have all articulated opposition to the notion of the librarian-teacher.[49] Wilson suggested that the concept of the librarian as teacher is an "organization fiction" that creates an inconsistent professional identity.[50] On the other hand, Michalak suggested quite the opposite in claiming that "librarians can best perform the instruction function in coordination with academic departments by the development of formal courses of instruction in the bibliographical and research resources of a specific discipline."[51] The librarians to which Michalak referred are subject specialists who act as liaisons between academic departments and the library. It is clear that the general literature of bibliographic instruction reflects the willingness of an increasing cadre of librarians to assume responsibility for library instruction. However, it is important to realize that the persistence of source-oriented, library-model instruction as taught by some library faculty reflects their academic backgrounds, and suggests that significant resistance to change in the conception of both what is to be taught and who should teach may well come from the librarians themselves. This is not to say that the academic background of librarians is inadequate for the task, but rather that the success of the instructional process may require translation of knowledge from the academic library experience into the conceptual frameworks and habits of users. If this translation occurs, there may be no debate about who will assume responsibility for library instruction in the research process.

Conclusion

Successful education of undergraduates in research strategies hinges primarily on the decision about what is to be taught. The questions of what level of student should be taught, what methods should be used, and who should do the teaching, while not unimportant, are at this stage of secondary concern. The primacy of the "what is to be taught" issue has been illustrated by McInnis, who said: "This increasing stress on the bibliographical aspects of scientific literature in instruction is in obvious contrast to students' inability to make effective use of library materials. This issue, of course, will not easily be resolved.

An approach to instruction in research strategy which emphasizes the epistemological components of scientific literature holds much promise as a means of resolving this predicament."[52]

The history of American higher education teaches that change in academe occurs slowly, if at all. Therefore, hopes for quick, meaningful recognition of the "information explosion" and the necessity for concomitant change in research strategies may well be frustrated. However, those involved in bibliographic instruction must persevere and continue to work with disciplinary faculty in developing research strategies which will best serve the students.

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