Research in School Library Media for the Next Decade: Polishing the Diamond

DELIA NEUMAN

ABSTRACT
OVER THE NEXT DECADE, research in school library media should focus explicitly on the relationship between library media programs and student learning. Attention to this topic has been a growing theme in the field's research for decades, and a number of factors argue for making it even more central in the coming years: the increasing emphasis on learning and achievement throughout education; the deepening appreciation for the library media specialist's various roles as they relate to this emphasis on learning; the emergence of electronic information resources that highlight the relationship between learning and information use as never before; and the publication of the Information Literacy Skills for Student Learning in *Information Power: Building Partnerships for Learning* (American Association of School Librarians and Association for Educational Communications and Technology [AASL and AECT], 1998). These statements of learning outcomes related to information use tie the school library media field directly to learning as nothing has done before. They provide both a rationale and a conceptual framework for studying students' interactions with information as the kind of authentic learning that is the goal of education in the twenty-first century.

INTRODUCTION
Picture a simple graphic—the shape of the diamond that you would see in a deck of cards. Now think of this shape as a visual metaphor for the next decade's most important research for the school library media field. One of the following four questions would occupy each of its corners:

Delia Neuman, Associate Professor and Coordinator, School Library Media Program, College of Information Studies, 4105 Hornbake Library Building, University of Maryland, College Park, MD 20742–4345

1. What are the contributions of library media programs to student achievement?
2. What are the roles of the library media specialist in today's schools?
3. How do students use electronic information resources for learning?
4. What has been the impact of the Information Literacy Skills for Student Learning on library media programs?

At the center of the diamond, illuminating each of the questions and reflecting the light from the answers, is the issue that has always been at the center of education: student learning. For the next decade and beyond, the most important research area for the school library media field involves establishing and documenting the direct relationship of library media programs and library media specialists to that central educational focus. Thus, the four questions draw their luster from the centrality of student learning to the library media field. Answering them in ways that shed light on the relationship of the field to learning will polish the diamond and make it shine more brightly in its own right and sparkle more valuably in the larger field of education.

The questions are grounded in the field's existing body of scholarship at the same time they open new lines of inquiry. The first two have captured researchers' attention for over a generation, but new developments—political as well as technological—have changed the components of the questions and the nature of the answers. The third focuses on a "new" issue but cannot be answered without reference to what we know about learning in general and about learning with information in particular. And the fourth addresses an even newer issue, since there has not yet been enough time to gather enough data to answer it in any meaningful way. Nevertheless, it, too, is grounded in assumptions and priorities the field has held since its inception. And by the end of the coming decade, this facet of the diamond may represent the most important research question in the field.

Other questions will also be important to the field in the next decade—for example, more research like Latrobe and Masters's (2001) study of the implementation of the field's new national guidelines, *Information Power: Building Partnerships for Learning* (AASL and AECT, 1998), would obviously add to our understanding of a variety of issues. With over fifty-six thousand copies of these guidelines sold in twenty-four countries (Robert Hershman, personal communication, March 11, 2002), there is a substantial arena in which to conduct research on the influence of the document, both nationally and internationally. In addition, gathering national statistics about library media programs in the United States in a more regular and comprehensive manner than is currently done would clearly help establish a baseline against which future progress could be measured (A. C. Weeks, personal communication, March 10, 2002). But the four questions noted above are more fine-grained and ultimately more central to the field's es-

sential and enduring concerns. Taken together, they represent library media's diamond-hard core as well as suggesting new facets that will help move forward both the field's research agenda and its effective practice.

1. WHAT ARE THE CONTRIBUTIONS OF LIBRARY MEDIA PROGRAMS TO STUDENT ACHIEVEMENT?

No one would deny that this is an area of singular importance to the field. While library media professionals "know" the value of their programs' contributions and can point to individual studies as evidence of that value, the field needs more systematic and widespread research evidence in this area to support its claims. Gathering this evidence is important on a professional level as well as a political one. As a professional discipline, library media has an obligation to examine itself and its programs continuously to ensure that they are useful and effective. Politically, until research yields compelling—and widespread—evidence of the nature and extent of library media programs' contributions to measurable student achievement—and until administrators and other decision-makers are convinced to pay attention to that evidence—library media programs' status in the schools will be marginal, even tenuous.

Fortunately, we can point to a large body of work that has been conducted in this area over a period of many years (see, for example, Didier, 1984). More recently, Keith Lance and his colleagues' series of important studies have confirmed a positive relationship between library media programs and student achievement virtually across the United States: the two "Colorado" studies (Lance et al., 1993, 2000b) and the studies in Alaska (Lance et al., 2000), Oregon (Lance et al., 2001), Pennsylvania (Lance et al., 2000a), and Texas (Smith, 2001) that are based upon the "Colorado" methodology. This research has established a strong enough pattern not only to excite the field but also to command the attention of an even wider audience. In fact, shortly after the "second Colorado study" appeared, the newsletter *eSchool News Online* announced in a headline that "Strong media centers boost students' test scores, study says" (Guerard, 2000). The writer clearly knew what was important to the newsletter's readership of educators concerned about technology and learning: the direct relationship of library media programs to measurable outcomes.

Additional replications of studies like these in other states would buttress this pattern to make an even more compelling case for the overall contributions of library media centers to the outcome measures we label "student achievement." Although it is difficult to predict how many such studies are necessary to provide a "critical mass" that will move the importance of the field into the privileged status of conventional wisdom, it's clear that more studies that carry on the "Colorado" tradition would only strengthen library media specialists', the public's, and the educational establishment's perceptions of the field.

Overall student achievement, however, is only the most obvious begin-ning. The discussion of library media programs' contributions to student achievement has many subthemes that also need further exploration: as-sessment, equity, collection development, and even flexible access. These subthemes are grounded in issues related to student learning and cover not only the measurement of that learning (a.k.a., "student achievement") but also the strategies and conditions that contribute to it. Moreover, research on the relationship of library media programs to actual student learning—that is, to the process of developing new understandings—is significant enough in and of itself to deserve a priority of its own (see below).

Assessment of student learning is increasingly important in light of national and state priorities on documenting the success (or failure) of the educational enterprise that consumes such a large percentage of public funds. While it is always important to remember that learning and the as-sessment of that learning are two different things, it is also important to understand that assessment measures provide educators' only avenue for demonstrating to the world at large the worth of their curricular and in-structional programs. This is as true for information literacy as it is for math, English, social studies, and science. If learning through the use of informa-tion is ever to be taken as seriously by education in general as are these "core subjects," the library media field must develop, test, and implement assess-ment measures that provide evidence of the widespread success and value of this kind of learning.

Strict, narrow measures of students' learning with information fail to capture the richness of the kind of achievement library media programs support. However, developing and validating objective measures of students' attainment of information skills is an important research task. Such mea-sures, while limited, provide a window into the nature and extent of stu-dents' information literacy and, by extension, the contributions of library media programs to that important goal. Once again, an array of tools that provide solid starting places is already in place: writers of curriculum frame-works in states and localities across the nation have developed learning outcomes in library media and information skills and have designed tests to measure students' attainment of those outcomes. Collecting and analyz-ing student data from a national sample of these tests would begin to pro-vide a broad picture of library media programs' effectiveness. Further, sys-tematic efforts to collect state and local instruments, validate the most promising of them, use the validated tests in a variety of locations, and analyze the resulting data could establish even more widespread and con-sistent evidence of the contributions of the field to student achievement.

Augmenting objective measures with a variety of other tools that pro-vide "authentic assessments"—for example, rubrics, portfolios, and project-based performance assessments—can provide further evidence of library media programs' unique contributions to student achievement. The con-

cepts and techniques of authentic assessment are not new to either research or practice in the field, and its literature has discussed it for quite some time (see, for example, Grover, 1994; Kuhlthau, 1994; Neuman, 2000; Thomas, 1999). Research that explores and documents the most useful of the options and provides details about their effective implementation would help the field contribute more fully to the discussion of achievement and the role of the library media program in it. Grover, Lakin, and Dickerson's (1997) interdisciplinary model that provides a mechanism for library media specialists to collaborate with teachers in planning and conducting integrated assessments offers a useful framework for thinking about that kind of research. And again, as with objective measures, collecting and analyzing the results of a national sample of individual authentic assessments could further buttress the library media field's claims to value.

Evidence of the field's contributions to equity would also enhance library media programs' abilities to serve students and enhance the library media specialists' image as powerful agents for educational improvement and student achievement. While a great deal has been written in recent years about the "digital divide" and the place of schools in addressing it (see, for example, Solomon, 2002; Swain & Pearson, 2001), little has been written on the topic for the library media field since Neuman's model for fostering equity with technology appeared in 1990. That model has never been tested empirically, and research into its effectiveness would establish (or negate) its validity and suggest additional elements that should be incorporated into library media specialists' efforts in this critical arena. Further research exploring the contributions of library media programs to equitable access and use regarding information technology and information resources could have several positive effects: it could help library media specialists address a topic that is closely allied with the profession's key ethical principles, and it could create a body of evidence that demonstrates library media programs' unique role in the achievement of *all* our students—disabled and disadvantaged as well as "typical."

On the surface, studies related to collection development and flexible access appear less compelling in themselves than many other areas within library media's overall research agenda for the next decade. However, tying these topics to the issue of achievement and learning would ground them in the essential issues of the field. For example, Tallman and van Deusen's (1994) series of reports that detailed the interrelationship of scheduling and other "practical" issues and the implementation of the library media specialist's role in collaborative planning and instruction demonstrated clear ties between such day-to-day matters and the opportunity for the library media specialist to enhance student learning. In the future, research that explores the connections between resources and access to the goal of equity and, in turn, to the goal of learning could demonstrate yet another facet of the library media program's importance to student achieve-

ment. While the "Colorado" studies have begun to investigate these con-
nections, and Bradburn (1999) provides useful tools for documenting some
of them, there is far more to be done. Establishing collection development
and flexible access as essential components of equitable twenty-first-centu-
ry learning and achievement could strengthen the library media field both
substantively and politically.

2. WHAT ARE THE ROLES OF THE LIBRARY MEDIA SPECIALIST IN TODAY'S SCHOOLS?

Not surprisingly, the recurring theme of "role" continues to need re-
search attention. A concern of researchers and theorists virtually since the
beginnings of the field, the question of the various roles of the library media
specialist takes on new dimensions each time education shifts its perspec-
tive and priorities. The last decade has seen a tremendous shift in virtually
every aspect of education—from its underlying pedagogical theories to its
organizational structures and its preferred strategies for teaching and learn-
ing—and the coming years are likely to witness both a continuation of these
changes and the introduction of new emphases and trends. What, then, are
the roles of the library media specialist in the first decade of the twenty-first
century? What elements of the four roles set forth in *Information Power:
Building Partnerships for Learning* (AASL and AECT, 1998) are valued/prom-
inent/evident in today's schools? Ultimately, the question that future re-
search must address is how each role contributes to the central concern of
all of today's educators—student learning.

Once again, future research into the roles of the library media special-
ist can be grounded in discussions that have peppered the field's literature
throughout the latter part of the twentieth century. It is important to note,
however, that many of these writings have focused on describing particu-
lar facets of the library media specialist's overall role or proselytizing for
them; the preponderance of authors have stopped short of providing evi-
dence of their value or importance to students and schools. Now, however,
the field must replace rationales and calls to action with systematic research
related to the nature, uses, and successful implementation of each of the
four roles of the library media specialist. The key questions, once again,
revolve around the contribution of each role to student learning.

In 1988 *Information Power: Guidelines for School Library Media Programs*
(AASL and AECT, 1988) identified three roles for library media specialists—
teacher, information specialist, and "instructional consultant." The role of
the library media specialist as a teacher of "library skills" or "information
skills" had been well accepted for several decades, but the "instructional
consultant" role was new and received the most research attention in the
1990s. Even in the decade before *Information Power,* this role had been a topic
of intense discussion (see, for example, Craver, 1986, 1990). Studies in
ensuing years (see, for example, Pickard, 1993; Putnam, 1996) have gen-

erally concluded that the role is "honored in the breach" rather than in prac-
tice: while library media specialists agree with the idea of working with teach-
ers to design and implement instruction, pressures of time, schedule, and
teachers' perceptions often preclude the active collaboration the role en-
tails.

The field's current guidelines—*Information Power: Building Partnerships
for Learning* (AASL and AECT, 1998)—retitled the instructional consultant
role, calling it "instructional partner"; kept two other roles from the 1988
guidelines ("teacher" and "information specialist"); and added a fourth role:
"program administrator." Clearly, research in the coming decade should
focus on the nature and impact of each of these roles in contemporary
education: What does the library media specialist, as teacher and instruc-
tional partner, contribute to student learning in a school that is moving to
a constructivist philosophy or has one in place? In a political climate that
identifies (and funds) reading as a preeminent student goal? How does the
library media specialist add value, as an information specialist, in a tech-
nology-rich environment that undergirds not only the school but the im-
mediate communities and the larger society in which today's students and
their families live? How does the new prominence assigned to the library
media specialist's role in program administration affect principals' and
teachers' perceptions of the library media specialist as a member of the
instructional team? How does it affect the library media specialist's actual
ability to affect curriculum, instruction, and—ultimately—student learning?
All these questions and a host of similar ones need research-based answers
if the field is to move forward in a productive and systematic fashion.

At present, of course, such answers are sparse: the five years since the
publication of the new guidelines have not given library media specialists
enough time to implement each of the roles fully, let alone provided re-
searchers enough time to study them extensively. McCracken (2001) is the
first to take up this line of research in recent years with her survey of library
media specialists' perceptions of the importance and practicability of each
of their roles, both those identified in 1988 and the new titles promulgat-
ed in 1998. In addition, several studies that appeared even before 1998
suggest other promising approaches for examining the nature and impact
of the newly stipulated roles. For example, Bishop and Blazek's (1994)
qualitative study of library media specialists' activities in a literature-based
reading program in Florida confirmed that the library media specialist can
have an important impact in such programs and provided insightful details
about the relationship of the roles of teacher, information specialist, and
instructional consultant in that impact. Van Deusen's (1996) case study of
one library media specialist's instructional consulting role in a new elemen-
tary school identified eleven separate tasks the library media specialist
played in instructional-team meetings and offered suggestions for both
practice and preparation that would facilitate the completion of those tasks.

Van Deusen's conclusion that the library media specialist is an "insider/out-sider" member of the teaching team provides the kind of insight that has strong potential for helping the field understand—and build upon—the nature and impact of this particular role. Future studies that plumb the details of all four of the library media specialist's roles can provide a knowl-edge base that clearly links the roles to student learning and thereby pro-motes the substantive and political welfare of the field.

3. HOW DO STUDENTS USE ELECTRONIC INFORMATION RESOURCES FOR LEARNING?

Student learning is at the heart of the school library media field, and the question of how students learn with electronic information sources is one of the field's key research questions for the coming decade. While print and audiovisual resources are sure to remain important tools for learning in classrooms and library media centers, it is the interactive resources that hold the greatest promise for enabling students to engage meaningfully with information and to use it as the basis for developing sophisticated under-standings of the world in which they live. Learning with information is the authentic learning that is sought by all educators today, and fostering learn-ing with information is the library media program's central contribution to student learning and achievement. Research that explores students' learning with the emerging—and still not fully understood—electronic resources that will provide the richest venue for their learning throughout their lives should be a central focus for the field.

As with the other questions under consideration here, the basis for this facet of the next decade's research can be found in the "traditional" library media literature. Over thirty years ago, Joyce and Joyce (1970) became the first researchers in the field to explore the direct relationship of informa-tion use to learning. More recently, a host of other library media research-ers have mined this territory. In the 1980s and 1990s, for example, the re-source-based learning movement spawned considerable interest in the use of information resources as the basis for student-centered learning (see, for example, Bleakley & Carrigan, 1994; Eisenberg & Small, 1995; Meyer & Newton, 1992; Ray, 1994). During this period, a variety of researchers not directly associated with the movement also contributed to the burgeoning literature on information use and learning: Garland (1995), McGregor (1994a, 1994b), Moore and St. George (1991), Pitts (1994), and Stripling (1995) have all added to the literature on this topic. Perhaps as an indica-tion of the importance of these developing ideas, the entire inaugural is-sue of the journal *School Libraries Worldwide* (Oberg, 1995) was devoted to learning with information.

More recent literature continues to address this issue, and a few exam-ples suggest the breadth of current research and theory on the topic: Carey (1998) has linked information literacy to learning theory in general and

to higher-order thinking skills in particular; Kuhlthau (1999) has chronicled the views of participants in the Dewitt-Wallace Reader's Digest Fund's Library Power Project on the relationship of the library media center to learning; McGregor (1998) has examined the relationship between learning and the everyday details of the research process as understood by students; and Todd has looked both at the impact on content learning of integrated information-skills instruction (1997) and at the way information use changes the cognitive models of adolescent girls (1999). Donham, Bishop, Kuhlthau, and Oberg (2001) have compiled learning-related findings from the Library Power Project into a useful summary document that suggests important points of departure for further research on learning with information, while Thomas (1999) has presented a range of work concerning students' effective use of ideas and information that offers a comprehensive overview of findings and issues that provides solid grounding for future research. Clearly, there is no dearth of research and theory in the field that can feed into a comprehensive framework to underpin studies of how learning plays out in electronic environments.

Another important source for developing such a framework is provided by the major information-seeking models created by scholars in the field, all of which include steps that lend themselves to a "learning" focus. The Stripling and Pitts REACTS model (1988), for example, called for students to "draw their own conclusions," create personal perspectives from information, and "create original solutions"—all components of authentic learning. Kuhlthau (1993) entitled her book *Seeking Meaning*, connecting the search for information to the kind of personalized construction of meaning (i.e., learning) that is the optimal result of such a search. Eisenberg and Berkowitz (1990) entitled their book *Information Problem Solving*, relating their Big Six Skills directly to one of the forms of higher-order learning most prized in schools today. Joyce and Tallman's I-Search model (1997) includes "reflecting" as a key component in students' pursuit of information based on their personal interests, while Pappas's (1997) "Pathways to Knowledge" emphasizes interpretation of information as a key to moving from the gathering of information to the attainment of knowledge. Each of these models, then, provides implicit theoretical support for a research focus on learning with electronic information resources. Making that focus explicit is a logical next step.

There is also a great deal of research related to information seeking in electronic environments that can be merged with the literature on learning with information to guide the researcher who wishes to examine learning in the electronic realm. Many studies have investigated students' searching and retrieval behaviors with electronic sources, noting in particular the problems young people encounter along the way to finding and recording appropriate information (e.g., Bilal, 2000, 2001; Fidel, 1999; Hirsch, 1997, 1999; Oliver & Perzylo, 1994; Perzylo & Oliver, 1992; Schacter et al., 1998;

Small & Ferreira, 1994; Solomon, 1993). Some researchers have approached the issue of learning in electronic environments by couching their discussions within issues related to learning or by drawing implications for learning from their findings (e.g., Kafai & Bates, 1997; Kuhlthau, 1997; Liebscher & Marchionini, 1988; Marchionini, 1989; Marchionini & Teague, 1987; Solomon, 1994). Others (e.g., Aversa & Mancall, 1986; Callison & Daniels, 1988; Crane & Markowitz, 1994; Mancall, 1984; Neuman, 1993, 1995, 1997) have contributed to a stream of research and scholarship that has addressed the usefulness of databases and other tools as venues for helping students develop skills in critical thinking and in mastering those "higher-order thinking skills involved in designing, conducting, and interpreting research" (Neuman, 1995, p. 291).

It is important to note, however, that a specific focus on using electronic information resources for *learning* (rather than only for information retrieval or for fostering skills directly related to that retrieval) is relatively new for the library media field. Such resources are themselves still relatively new, and discussions of learning with them have received close and direct research attention in the library media area for less than a decade. For example, two important publications—Kuhlthau's edited volume entitled *The Virtual School Library* (1996) and a special issue of *Library Trends* devoted to "Children and the Digital Library" (Jacobson, 1997)—focused primarily on describing and explaining the new information environments for children that were evolving in school and public libraries and included relatively few papers related specifically to learning in those environments. Now that the field has a better understanding of the environments themselves, the time has come for a wide range of studies that explicitly examine the link between student learning and the electronic resources that have become a staple of library media programs.

To date, Large and his colleagues' series of studies offer the field's most intensive and extensive look at information use and learning in electronic environments (Large et al., 1994a, 1994b, 1995, 1996, 1998, 2000). Working with a variety of other researchers, Large has examined students' interactions with a variety of electronic resources, studying their information-processing strategies from the initiation of their search strategies, through their navigation of the resources, to their extraction of information for classroom assignments. Over the years, this group has provided thoughtful and insightful commentary on the possibilities and constraints inherent in using these tools for learning. Now, others are entering the discussion: Neuman (2001, in press [a]) has argued that synthesizing—the process of creating a personal conceptual structure from information elements found in discrete electronic resources—is the key to learning with the World Wide Web, while Chung (2002) has demonstrated a connection between information-seeking in electronic resources and learning at each of the six levels in the recent revision of Bloom's taxonomy (Anderson & Krathwohl, 2001).

In the next decade and beyond, researchers must perform the challenging intellectual task of integrating the insights gleaned from the rich but somewhat disparate research areas noted above into a comprehensive conceptual framework that can guide systematic research on the relationship between learning and information seeking in electronic environments. And, just as the convergence of decades of research into children's information-seeking and use can undergird a conceptual framework that moves to a direct and explicit focus on this topic, other theoretical and research traditions, too, must be incorporated into that framework to make it robust and comprehensive. In particular, instructional systems design has contributed extensively to discussions of information environments as learning venues and offers strong promise for helping library media researchers gain a comprehensive understanding of the interactions among students, information, and learning.

Robert Kozma's seminal 1991 article on learning with media provides theoretical guidance for much of the research on learning in the information-rich multimedia environment of the World Wide Web that would be of value to the library media field. Other instructional-design researchers, especially Michael Hannafin and his colleagues at the University of Georgia, have developed a strong research strand in this area. (See, for example, Hannafin, 1992; Hannafin et al., 1994, 1999; Hill, 1999; Hill & Hannafin, 2001; Oliver & Hannafin, 2001; and Park & Hannafin, 1993.) Others, too—like Edelson et al. (1999), Goodrum, Dorsey, and Schwen (1993), Mioduser et al. (2000), and Roschelle et al. (2000)—offer relevant insights couched within an instructional-design framework. In one of the more recent contributions from this field, Jonassen, Peck, and Wilson (1999), explaining how technologies can foster learning, describe five roles that technologies can play "as engagers and facilitators of thinking and knowledge construction." In one of these roles, technologies serve as "information vehicles for exploring knowledge to support learning-by-constructing" because they provide opportunities "for accessing information [and] for comparing perspectives, beliefs, and world views" (p. 13). Clearly, Jonassen et al. are describing the electronic information resources that concern the library media field. Thinking of these not only as venues for information seeking but also as learning tools would enrich any researcher's conceptual framework for studying the relationship of library media programs to learning.

In fact, Jonassen and other theorists and researchers from instructional systems design can help the library media field focus on authentic learning with information. By expanding library media researchers' understanding of the learning potential of electronic information resources, instructional design can help them frame and answer questions about how students represent knowledge in their own minds at various stages of the information-seeking process, how they extract information from both textual and visual presentations and construct personal meaning from it, how

they integrate various kinds of information into their own understandings, how they move from one level of understanding to another, and how information use supports the growth and development of students' changing conceptual structures as they move forward along the novice-to-expert continuum. Finding answers to these difficult and complex questions could not only enrich research and practice within the library media field, it could help to strengthen the link between information use and learning that is central to the field's mission and to its stature within education as a whole. By reinforcing that link with research-based evidence of library media's contributions to students' learning with electronic resources, researchers in the field would be making an important contribution (Neuman, in press [b]).

4. What Has Been the Impact of the Information Literacy Standards for Student Learning on Library Media Programs?

The Information Literacy Standards for Student Learning (ILSSL) are the cornerstone and most important contribution of *Information Power: Building Partnerships for Learning* (AASL and AECT, 1998), the latest set of guidelines for the school library media field. Validated by a national Delphi study (Marcoux, 1999), the nine Standards and their twenty-nine associated indicators are direct statements of learning outcomes—the first ever to be endorsed by the two national associations that represent the library media field. For researchers, the ILSSL suggest a virtually unlimited number of topics to investigate related to various aspects of their general and specific impact on library media programs. Now that they have been available for almost five years, it is time to begin that research in earnest. By the end of the decade, its results should provide a wealth of theoretical and practical insights for the field.

At one level, answering the question about the impact of the ILSSL on library media programs is fairly straightforward. States and localities began adapting them to meet their own curricular and instructional needs even before *Information Power* was published, so tracing the Standards' evolution into state, district, and local documents would be a comparatively straightforward task. It's a task that should be done in order 1) to provide an understanding of the extent to which the field has adopted these "learning statements" in both theory and practice, and 2) to delineate the ways in which these national statements have been modified and implemented to meet local needs. A national collection of this "demographic" research would not only document the reach of the Standards into library media programs but would also provide a rich set of related statements of learning outcomes that individual schools could use in further developing and refining their library media programs and services.

Additional studies should address whether and how well the ILSSL function as tools for collaborative planning and teaching—one of their

primary purposes, according to *Information Power:* "The [ILSSL] provide the basis for the library media specialist's role in collaborative planning and curriculum development. . . . They strongly support the school library media specialist's leadership role in analyzing learning needs, identifying instructional strategies and resources, and evaluating student achievement" (AASL and AECT, 1998, p. 63). Case studies of the nature, process, and effects of using the ILSSL in planning and conducting collaborative instruction can lead to insights about how well the Standards support the library media specialist's role as an instructional partner—historically one of the most difficult of his/her roles to implement. Results of such studies could provide both theoretical and practical guidance for the field in helping to establish library media specialists—both substantively and in their colleagues' perceptions—as central players on schools' learning teams.

Research into the overall impact of the ILSSL on library media programs must involve studies that look directly at the impact of these statements on the learning that such programs are designed to foster. In fact, the singular importance of the Standards is that they tie the field directly to learning as nothing has done before: according to *Information Power,* the ILSSL "are the foundation for the school library media program. . . . They demonstrate clearly that information skills are integral to learning and teaching and should be linked to the curriculum in every subject area and grade level" (AASL and AECT, 1998, pp. 61–62). For researchers, the ILSSL both reflect decades of previous research on the relationship of the field to learning and provide a framework for designing further research in this critical area. Extensive studies of the details of students' interactions with information resources as they work to meet the Standards and indicators can enable researchers to tackle questions about the nature, processes, and effects of learning with information. Collecting the results of such studies across the nation can contribute significant color and texture to a broad picture of the overall effectiveness of library media programs.

The Standards and indicators themselves provide a convenient yet comprehensive framework for such studies. Broad statements of learning outcomes, the Standards are similar to instructional goals that describe long-term results that cannot be directly assessed—for example, "The student who is information literate evaluates information critically and competently" (Standard 2, p. 14); "The student who is an independent learner is information literate and appreciates literature and other creative expressions of information" (Standard 5, p. 26); and "The student who contributes positively to the learning community and to society is information literate and participates effectively in groups to pursue and generate information" (Standard 9, p. 39). The indicators are more narrowly focused, describing specific outcomes that are similar to objectives that can be observed and even measured to provide an assessment of students' mastery of the learning they describe—for example, "Seeks information from diverse sources, contexts,

disciplines, and cultures" (Standard 7, Indicator 1, p. 33). A teacher or library media specialist could easily devise a way to evaluate whether his or her students seek information broadly, perhaps simply by checking bibliographies in students' papers to determine the extent of their searching.

Some of the indicators describe varieties of learning that are directly related to the information-seeking process—for example, "Develops and uses successful strategies for locating information" (Standard 1, Indicator 5, p. 11) and "Assesses the quality of the process and products of personal information seeking" (Standard 6, Indicator 1, p. 29). Others go beyond consideration of the learning required to seek and find information to describe varieties of cognitive processing that are at the heart of learning itself—for example, "Integrates new information into one's own knowledge" (Standard 3, Indicator 2, p. 19) and "Applies information in critical thinking and problem solving" (Standard 3, Indicator 3, p. 21). Still others describe some of the most subtle kinds and highest levels of learning sought in schools today—for example, "Derives meaning from information presented creatively in a variety of formats" (Standard 5, Indicator 2, p. 26); "Collaborates with others, both in person and through technologies, to design, develop, and evaluate information products and solutions" (Standard 9, Indicator 4, p. 41); and "Devises strategies for revising, improving, and updating self-generated knowledge" (Standard 6, Indicator 2, p. 30). Taken together, the Standards and indicators describe the full range of learning outcomes, from basic to sophisticated, that constitute authentic learning in the information age. They provide a ready framework for researchers to use in investigating the direct contributions of the ILSSL to student learning and achievement (Neuman, in press [b]).

As with the questions discussed in earlier sections of this paper, this one is grounded in a history of related research that can inform the next stages of the field's research agenda. In fact, much of the specific research discussed in those earlier sections can also be applied here: studies of information seeking and of learning with both traditional and emerging information resources, for example, can obviously contribute to a conceptual framework for research on ways in which the ILSSL contribute to learning. Other writing in the field can also be brought to bear: for example, the wide range of pieces on information literacy obviously provide important theoretical grounding for research related to the Standards and their utility in learning. Breivik and Senn (1994) are perhaps the best-known proponents of information literacy as a key element in twenty-first century education, but others have addressed the topic as well. Among these are Neuman (1997), who proposed information literacy as the framework for addressing issues related to learning in the digital library; Carey (1998), who argued for the importance of ensuring higher-order outcomes in information literacy; and Fitzgerald (1999), who has already raised some of the key

questions related to information literacy and the Standards, particularly the challenges involved in students' abilities to evaluate information.

In many ways the question of the impact of the Information Literacy Skills for Student Learning provides the touchstone for much of the critical work that should be done in the library media field in the coming decade. In fact, the question integrates and provides a context and theoretical structure for a research agenda encompassing all three of the other questions set out at the beginning of this paper as the most important for the field: any studies related to the impact of the ILSSL would inevitably address student learning with electronic resources, the roles of the library media specialist in fostering learning, and the nature and extent of the student achievement that might be related to library media programs. Important not only in and of itself, answering the question of the impact of the ILSSL is the key to understanding the functions and importance of library media programs in the first decade of the twenty-first century: "As the primary vehicle for linking library media programs and library media specialists with learning, [the ILSSL] are the key to implementing the vision that underlies *Information Power: Building Partnerships for Learning*" (AASL and AECT, 1998, pp. 49–50).

CONCLUSION

The question of student learning is at the crux of all the most significant research to be done in school library media in the next decade. The four research areas described above—the relationship of library media programs to student achievement, the roles of today's library media specialist, students' use of electronic resources for learning, and the impact of the Information Literacy Standards for Student Learning—form the corners of a diamond whose core is also the core of education: student learning. Establishing and documenting the direct relationship of library media programs and library media specialists to learning will show the centrality of student learning to the library media field, polishing the diamond and increasing the value of library media programs both in their own right and within the larger field of education.

At the dawn of the twenty-first century, student achievement is no less important to the library media field than to any other discipline. While research on the overall relationship of library media programs and library/information skills to achievement has been conducted for years, recent work has been especially successful in establishing a strong connection. It is important to the field that this research stream continue and that subthemes related to this general topic also be explored. Research into the uses and varieties of assessment that best serve library media programs' unique roles and contributions is one such subtheme; investigations of library media programs' role in ensuring equity is another. Studies that explore the rela-

tionship of collection development and flexible access to equity and ulti-
mately to learning and achievement could also strengthen the field both
substantively and politically.

Future research must also address the question of how the various roles
of today's library media specialist contribute to student learning and
achievement. Each of the four roles described in *Information Power: Build-
ing Partnerships for Learning* (AASL and AECT, 1998)—teacher, instructional
partner, information specialist, and program administrator—has been deep-
ly affected by the changes that have swept through society and education
in the last two decades. What, then, are the most important duties and the
most significant expectations of the library media specialist in the new cen-
tury's culture of change? Which elements of his/her roles and which com-
binations of those elements are most widely practiced and most widely val-
ued in the schools of the early twenty-first century? Ultimately, research
related to the library media specialist's roles should address the key ques-
tion of how each role contributes to the central concern of all today's edu-
cators—student learning.

Learning with information is the library media program's central con-
tribution to student learning, and research on learning with the electron-
ic resources that are emerging as essential sources of information should
be a key facet of library media research in the coming decade. Studies by
library media researchers that build on a comprehensive conceptual frame-
work that combines insights from a variety of traditions in theory and re-
search—studies of the general connection between information and learn-
ing, research on children's information seeking and use, exploration of the
"learning" components of our information-search models for children, and
insights into information environments as understood by theorists and re-
searchers in instructional systems design—can lead to a deeper understand-
ing of the relationship of information and learning and a greater appreci-
ation of the library media specialist's role in guiding students in effective
engagement with information as the basis for developing sophisticated
understandings of the world and their place within it. Such a contribution
from the library media field would not only advance its own theory and
practice but would also lead the way to a greater understanding of learn-
ing with information for the field of education as a whole.

The Information Literacy Standards for Student Learning, published
as the key element in *Information Power: Building Partnerships for Learning*
(AASL and AECT, 1998), provide a ready mechanism for linking the library
media specialist to learning and for studying that linkage systematically and
comprehensively. While the ILSSL have received extensive attention since
their appearance in the summer of 1998, much of the attention—under-
standably—has been devoted to practice as the field learned about and tried
to implement the new national guidelines. Now that the ILSSL have been
available for almost five years, it is time for researchers to begin to study

whether and how well they do, in fact, support student learning and achievement. One research strand should include studies of the overall contributions of the ILSSL to library media programs, both locally and broadly and both substantively and in the perceptions of other educators. Another should focus on the usefulness of the ILSSL as catalysts for collaboration with teachers and as tools for guiding curriculum and instructional development. Still another should address the details of students' cognitive and affective processes as they engage with the steps in information literacy and learn to use information to formulate increasingly mature and complex mental models. By the end of the decade, a range of such studies could further delineate the range of kinds of learning that are possible with information and provide strong evidence of the direct relationship that links the ILSSL and library media programs to that learning.

All four of these questions interweave traditional and emerging issues in the library media field, and all four are grounded in the scholarship and research of the field over the past thirty years or more. What has changed most significantly for the field in recent years stems from an increasing focus throughout education on learning rather than on teaching and on students' active construction of their own meaningful knowledge rather than on teachers' imparting ideas that students process more or less passively. This monumental shift in perspective has led in turn to a deeper understanding of learning as a process rather than only a product: learning has been reconceptualized from the behaviorists' notion of learning as a change in behavior or the ability to behave to the cognitivists' definition of learning as "the development of new knowledge, skills, or attitudes as an individual interacts with information and the environment" (Heinich et al., 2002, p. 6).

This focus on the process of learning—and especially on learning through encounters with information—has long been a thread in library media research, theory, and practice. Now, it has opened new opportunities for the library media field and has led to the field's increasing awareness of the importance of library media programs and library media specialists in fostering student learning. As *Information Power* notes, "Core elements in both learning and information theory . . . converge to suggest that developing expertise in accessing, evaluating, and using information is in fact the authentic learning that modern education seeks to promote" (AASL and AECT, 1998, p. 2). This new understanding has reshaped the field's view of itself and provided an impetus for research that both clarifies that view and instantiates it within the broader context of education.

Therefore, it seems clear that research that defines and explains the relationship of the field to student learning and achievement in a modern, information-rich culture is the most important research to be undertaken by the field's researchers in the coming decade. Learning is at the heart of the library media field and at the center of the "research diamond" proposed at the beginning of this paper. Research that illuminates how the

various facets of library media programs foster learning will add luster to the field, bringing out for the field itself and for the broader educational community the "many bright colors" praised in the old Spanish folk song "De Colores." As the chorus to that lilting and optimistic tune notes, "the diamond will sparkle when brought to the light."

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