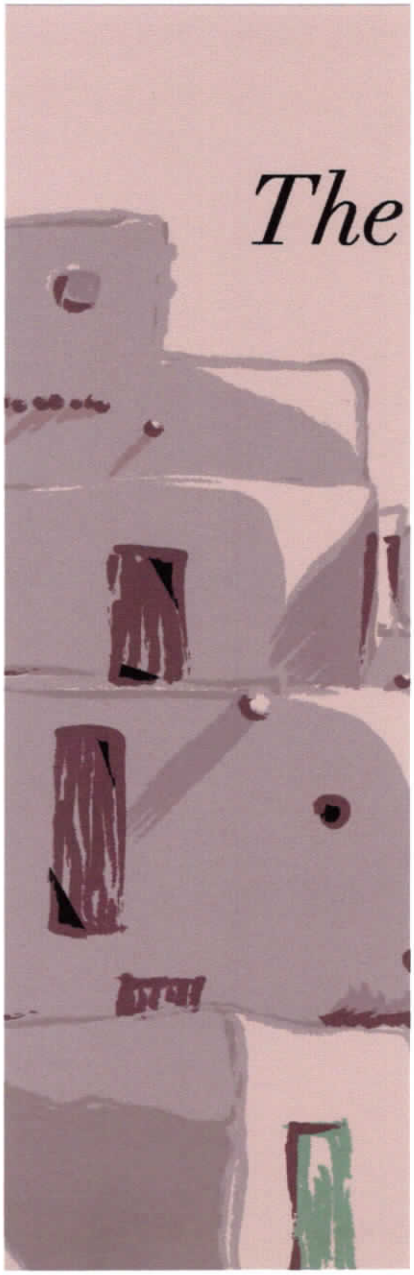
How School Libraries Improve Outcomes for Children



The New Mexico Study

Keith Curry Lance
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Acknowledgements

How School Libraries Improve Outcomes for Children: The New Mexico Study was a research project directed by the New Mexico State Library to collect information on school libraries and their relationship to student achievement, specifically in grades 4, 8, and 10.

The State Library would like to thank and credit the staff of the participating schools who made the time in their busy schedules to collect, compile, and report data required to complete the 2001 statewide school library study. Without their efforts, this study would not have been possible.

Very special thanks are due to the McCune Foundation for underwriting half of the costs of this research.

Special thanks to Bill Schwarz, who did yeoman work during both the preparation and data processing stages of this study. He assisted in matching data across many files, mining community demographic data, and in running the many SPSS statistical procedures that yielded the accompanying tables.

Thanks are due to the New Mexico State Department of Education for providing the substantial amounts of data required related to the state's public schools.

The review of the literature contained here updates the comprehensive review done for the original Colorado study. Indeed, it was produced by one of that review's co-authors, Christine Hamilton-Pennell of Mosaic Knowledge Works. In addition to updating her earlier effort with Lynda Welborn, she also did an excellent job of relating previous research on this topic to the themes of Information Power. This focus improves the organization and readability of the literature review and makes it more relevant to the current context of library media development.

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Executive Summary

New Mexico achievement test scores rise with the development of school library programs. The relationship between school library development and test scores is not explained away by other school or community conditions at the high school level. There was insufficient variation in librarian staffing to make similar claims for the elementary and middle school levels.

School Library Development

New Mexico achievement test scores tend to rise with increases in:

- school librarian and total library staff hours per 100 students;
- print volumes per student;
- periodical subscriptions, video materials, and software packages per 100 students; and
- school library expenditures per student.

Whatever the current level of development of the school library program, these findings indicate that incremental improvements in its staffing, collections, and funding will yield incremental increases in reading scores. The only caveat is that school library spending cannot exert a positive influence on academic achievement if it comes at the expense of other school programs.

School & Community Differences

The impact of school library development on academic achievement at the high school level cannot be explained away by:

- school differences, including:
  - the percentage of classroom teachers with master's degrees,
  - teachers' average years of experience, and
  - the teacher/pupil ratio, or
- community differences, including:
  - the percentage of schoolchildren living in poverty,
  - the percentage of schoolchildren belonging to racial/ethnic minority groups, and
  - the percentage of adults who graduated from high school.

When these other conditions are taken into account, school library development alone accounts for 7.9 percent of variation in average achievement scores among high schools. This figure takes into account community socio-economic status (SES), which explains 42.0 percent of variation in high school test scores. It also considers other school conditions that explain no additional variation beyond the 50.0 percent attributable to the combination of community SES and school library development factors.

Similar conclusions could not be drawn from such analyses at elementary and middle school levels, due to a lack of variation in school library staffing at those school levels. (Most elementary schools lacked a full-time librarian; most middle schools had precisely one full-time librarian.)

School Librarians & Strong School Libraries

School librarians exert a complex web of effects on the school library programs. Findings about these effects are summed up in the following description of a strong school library.

A strong school library program is one

- that is adequately staffed, stocked and funded. Minimally, this means one full-time librarian and one full-time aide. The relationship, however, is incremental; as the staffing, collections, and funding of school library programs grow, reading scores rise.

- whose staff are actively involved leaders in their school's teaching and learning enterprise. A successful school librarian is one who has the ear and support of the principal, serves with other teachers on the school's standards and curriculum committees, and holds regular meetings of the library staff. Students succeed where the school librarian participates with classroom teachers and administrators in making management decisions that encourage higher levels of achievement by every student.

- whose staff have collegial, collaborative relationships with classroom teachers. A successful school librarian is one who works with a classroom teacher to identify materials that best support and enrich an instructional unit, is a teacher of essential information literacy skills to students, and, indeed, is a provider of in-service training opportunities to classroom teachers. Students succeed where the school librarian is a consultant to, a colleague with, and a teacher of other teachers.

- that embraces networked information technology. The school library of today is no longer a destination; it is a point of departure for accessing the information resources that are the essential raw material of teaching and learning. Computers in classrooms, labs and other school locations provide networked access to information resources—the library catalog, electronic full text, licensed databases, locally mounted databases, and the Internet. Students succeed where the school library program is not a place to go, apart from other sites of learning in the school, but rather an integral part of the educational enterprise that reaches out to students and teachers where they are.

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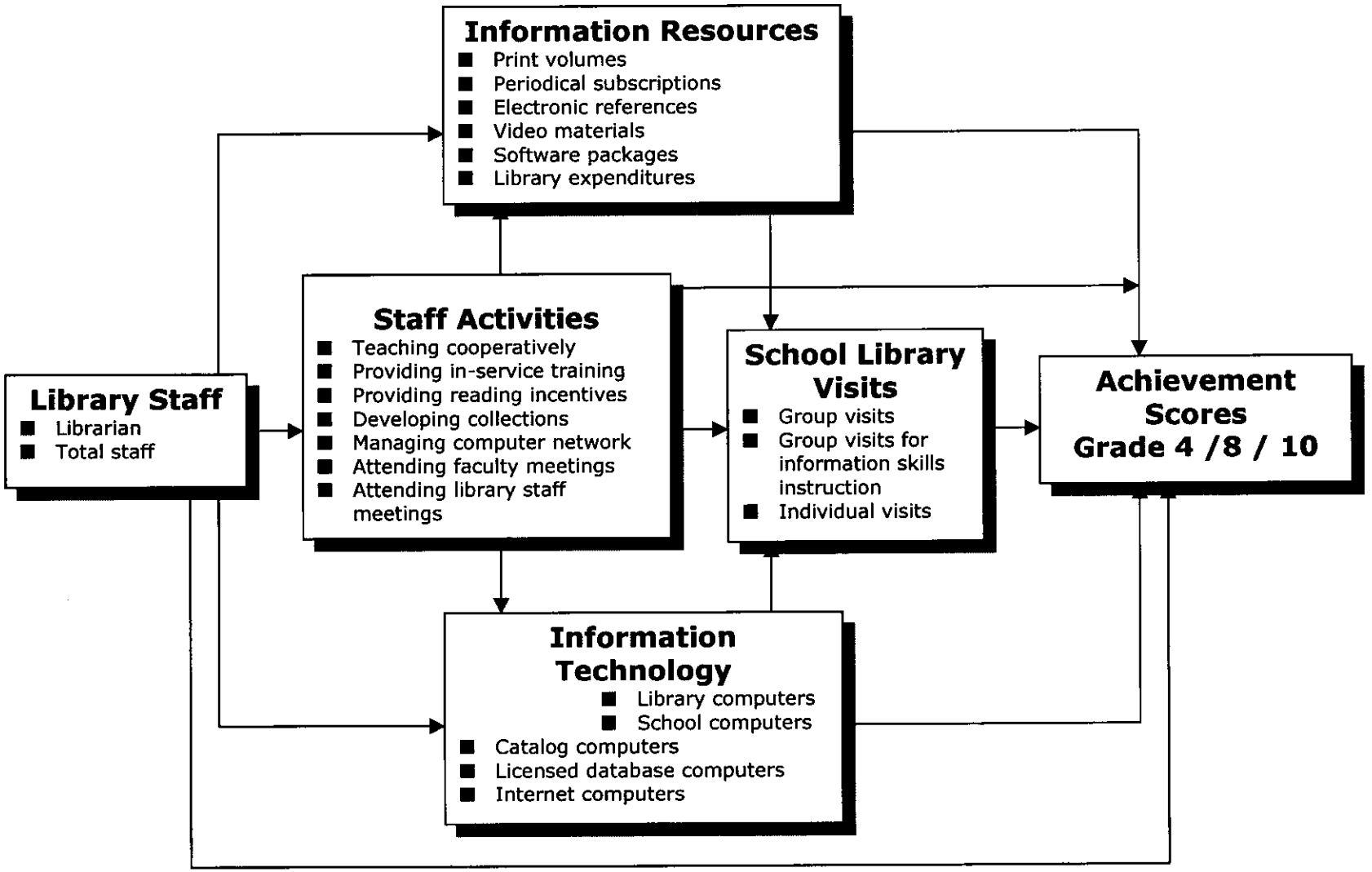

The Impact of New Mexico School Libraries on Academic Achievement
Summary of Relationships

Introduction

For many years, the declining condition of libraries in New Mexico public schools has been a cause for concern to the State Library. As part of a campaign to reverse this alarming trend, the State Librarian and others resolved to document the impact of school libraries and librarians in New Mexico schools and to share this information with school decision-makers—school boards, superintendents, principals, teachers, even school librarians.

In 1993, the Library Research Service of the Colorado State Library published a landmark study, **The Impact of School Library Media Centers on Academic Achievement**. Between 1999 and 2001, successor studies were completed in Alaska, Colorado, Iowa, Massachusetts, Oregon, Pennsylvania, and Texas. Realizing the potential for such a study in New Mexico, the State Library designate funds from the Library Services and Technology Act (LSTA) for this purpose.

In 2001, the State Library contracted for this study with the team of researchers responsible for the most of the other state studies: Keith Curry Lance, the principal investigator for this study as well as the original "Colorado study;" Marcia J. Rodney, a library research consultant; and Christine Hamilton-Pennell, consulting librarian and also a co-author of the original Colorado study.

In addition to confirming in New Mexico the findings of the first Colorado study, this project also sought to explore several issues that were explored in the other state studies. Those issues included:

- identifying characteristics of school librarians and school library programs that affect academic achievement,
- assessing the contribution of collaboration between teachers and school librarians to the effectiveness of school library programs, and
- examining the growing role of information technology in school libraries, particularly licensed databases and the Internet.

On all three of those counts, this New Mexico study was decidedly successful. This document reports comprehensively on the project, putting it into perspective with past research as well as the American Association of School Librarians' new standards, **Information Power: Building Partnerships for Learning** (1998). It also contains reports of the findings in a variety of readily useful formats, including: an executive summary, a brochure, and the preliminary report.

Review of the Literature

This study aims to replicate and expand upon previous research showing a link between student academic achievement and the school library media program. With the move to standards-based education, which focuses on what students have learned (proficiencies or outcomes) rather than what is taught (coverage of content), the school library media specialist is in a unique position to help students develop the information literacy skills which will enable them to achieve standards.

The new edition of **Information Power: Building Partnerships for Learning** (ALA, 1998), reflects a change in emphasis for school library media programs, from providing resources to students to creating a community of lifelong learners. Three overlapping roles are identified for school library media specialists (LMSs) in this document. The *learning and teaching* role supports the instructional goals of the school in both content (standards and subject curriculum) and process (information literacy skills). The *information access and delivery* role encompasses the more traditional responsibilities of the LMS, those of developing the media center's collection and services and providing access to them. A third role, *program administration*, includes both management of the library media program and larger training and advocacy functions within the school community.

This review of the research organizes the research findings under the three roles identified for the LMS in **Information Power** (1998). Many of the research studies were conducted in the context of the earlier guidelines, **Information Power: Guidelines for School Library Media Programs** (ALA, 1988). Although some of the goals in the document have changed, the underlying mission statement remains the same:

> The mission of the library media program is to ensure that students and staff are effective users of ideas and information. This mission is accomplished:

- by providing intellectual and physical access to materials in all formats
- by providing instruction to foster competence and stimulate interest in reading, viewing, and using information and ideas
- by working with other educators to design learning strategies to meet the needs of individual students. (ALA, 1998, p. 1)

Presence of a Library Media Center with a Professional Library Media Specialist

Many studies conducted before the advent of the **Information Power Guidelines** dealt with the value of the mere presence of a library with a professional librarian, reflecting the lack of centralized library service, particularly at the elementary level. Willson (1965) showed that students demonstrated superior gains on the Iowa Test of Basic Skills (ITBS) in elementary schools with a centralized library and a professional librarian. Likewise, Becker (1970) compared ITBS scores between students in elementary schools with and without libraries and found that the presence of a library and the guidance and function of a librarian appeared to exert significant influence on pupil achievement in some information-gathering skills areas.

In the study by Hale (1969), SAT scores improved among students receiving library service from a professional. McMillen (1965) found that students in schools with good libraries and full-time librarians performed at higher levels in reading comprehension and in knowledge and use of reference materials than students in schools with minimal or no library service. Didier (1982) confirmed that student achievement in reading, study skills and use of newspapers was significantly greater at the seventh grade level in schools with professional library media personnel as compared to schools without them. Student access to the library media center was also significantly greater in schools with professional library media personnel than in schools without them.

Yarling (1968) found that the addition of a well-equipped and managed centralized library had a significant impact on the performance of elementary school students in library-related skills, particularly outlining and note taking. Students who used a new fully staffed and equipped elementary school library also showed significant improvement in library skills test scores in the study by Ainsworth (1969). McConnaha (1972) found that the library skills test scores of high school students who had attended an elementary school with both a library and a librarian who conducted a strong library skills program were significantly higher than those of students who did not have these advantages.

Recent statistics show that public schools have moved in the direction of providing professionally-staffed library media programs at all levels. In a U.S. Department of Education-funded study conducted recently (Michie and Cheney, 2000), survey results indicate that as of 1997, 98 percent of public

schools have a school library media center, and 78 percent of public schools have a state-certified library media specialist.

Learning and Teaching

Early Studies

Some research studies before the advent of **Information Power Guidelines** in 1988 referred to various aspects of the LMS's teaching role. Aaron (1975) studied a group of eighth grade students who participated in a program in which a full-time media specialist was added to the teaching team. In addition to showing significant improvement in language arts, spelling, and math computation, the students in the experimental group experienced improvement in their self-concept. Bailey (1970) studied a group of disadvantaged first-grade students who participated in a library resource program over a 12-week period. The experimental group showed a significant increase in total language ability and the ability to express ideas over the control group of disadvantaged students who received no special treatment. DeBlauw (1973) examined the rate of cognitive growth of students on achievement test batteries before and after implementation of a multi-media program. Elementary students showed significant gains, but the academic performance of high school students was unchanged by the program. A longer-term study of twelfth grade English students by Gilliland (1986) found that test scores on the study-locational portion of the California Assessment Program improved during the years following implementation of a library review program.

Gengler (1965) looked at differences in the ability to apply selected problem solving skills between sixth grade students who were instructed by a classroom teacher and those who received additional instruction from an elementary school librarian. Findings showed that the mean score on a problem solving skills examination for the librarian-teacher instructed group was significantly higher than for the teacher instructed group. Hastings and Tanner (1963) looked at whether improved English language skills could be developed at the tenth-grade level through systematic library experiences rather than the traditional emphasis on formal English grammar. The group that eliminated all traditional emphasis on formal grammar and spelling and instead received systematic work in the use of library references was significantly superior to the groups that emphasized traditional work in grammar and spelling.

In a study by Hutchinson (1982), English teachers gave tenth-grade students special library skills instruction and practice over a two-week period. Library usage among the students increased regardless of their academic grade point averages. Hale (1970) found that an experimental group of twelfth grade students who were given a variety of library services and resources and the opportunity to work independently under the supervision of the librarian showed "remarkable enthusiasm" for learning. Barrilleaux (1965) focused on a comparison of the achievement of junior high school students in general science classes in which textbooks were used with students who used reference materials in the school library rather than a textbook. Results showed that for all investigated educational outcomes, the use of library materials without a basic textbook was the superior method of instruction.

Instructional Role Since Information Power Guidelines

Much of the research taking place after the introduction of the **Information Power Guidelines** in 1988 focuses on the instructional role of the school library media specialist. Lance, Welborn and Hamilton-Pennell (1993) found that students whose library media specialists played an instructional role, either by identifying materials to be used with teacher-planned instructional units or by collaborating with teachers in planning instructional units, tended to achieve higher reading scores. A study by the Library Research Service in Colorado (1998a) also found that students earned higher reading scores in schools where the LMS played a vital instructional role, including planning instruction with teachers, providing information literacy instruction, providing in-service training for teachers, and evaluating students' work.

Five recent statewide studies reinforce the importance of the LMS instructional role. A study conducted in Alaska (Lance, Hamilton-Pennell and Rodney, 2000) revealed that students' test scores tended to rise when library staff spent more time teaching information literacy to students and planning instructional units with teachers. In Pennsylvania (Lance, Rodney and Hamilton-Pennell, 2000a), test scores increased as LMSs spent more time teaching cooperatively with classroom teachers and integrating information literacy skills into the school's approach to standards and curriculum. A new study in Colorado (Lance, Rodney and Hamilton-Pennell, 2000b) concluded that reading test scores rise as LMSs plan cooperatively with teachers (at the 7th grade level), identify materials for teachers, and teach information literacy skills to students. A Massachusetts study by Baughman (2000) found that both elementary and middle school students

tended to score higher on the Massachusetts Comprehensive Assessment System (MCAS) test when there was a library instruction program. Likewise, in Oregon (Lance, Rodney, and Hamilton-Pennell, 2001), students tended to score higher on reading tests when their LMSs worked with classroom teachers to identify materials to support and enrich instructional units, taught essential information literacy skills to students, and provided in-service training opportunities to classroom teachers.

Gap Between Theory and Practice

Nevertheless, several researchers have identified a gap between theory and practice. Person (1993) found a discrepancy between the real and ideal role perceptions of LMSs. While they were aware of the roles identified in the **Guidelines**, they didn't perform them as often as they would have liked. Pickard (1993) also studied the gap between theory and practice of LMSs performing the instructional role and found that less than 10 percent of her sample appeared to be practicing the role to a great extent. Angelo (1994) verified this finding in a study which showed that the majority of LMSs were performing duties of the traditional librarian, such as student orientation and assisting students and teachers in finding materials, while a low percentage were performing planning and consultation roles. Kuhne (1993) concluded that school libraries need to be more integrated into the curriculum and that the school librarian could play a much more distinctive teacher role than he or she does today.

McCarthy (1997) studied LMSs who were "well above average" in the New England region and found that 58 percent of them believed that implementation of **Information Power Guidelines** was only somewhat realizable or not realizable at all. McCracken (2000), in a national survey of more than 500 LMSs, found that they perceived all the roles in **Information Power** (1988, 1998) to be more important than they were able to implement in practice. They also perceived that they practiced the role of information specialist (i.e., the traditional role of the librarian) to a greater extent than that of program administrator, teacher, or instructional partner and consultant.

Level of LMS Collaboration with Teachers

Instructional collaboration has many levels, and research indicates that LMSs are most often involved in the less complex levels. Slygh (2000) reports on

the difficulty of establishing exactly what is meant by the term "collaboration." She uses a definition by Van Deusen and Tallman (1994) that delineates an interdependent relationship between LMS and classroom teacher involving a continuum of five progressively complex levels of instructional collaboration, from gathering materials to collaborating with a teacher to evaluate a unit. Slygh found that teachers in her sample of Library Power schools indicated a greater frequency of collaborating with the LMS in planning and designing instruction than in delivering it.

A study by DeGroff (1997) compared the ideal roles of the LMS as laid out in **Information Power** (1988) with the actual practice of these roles. She determined that the instructional consultant activities of LMSs were usually limited to gathering books for instructional units and seldom involved participating with teachers in developing, carrying out, or assessing unit plans. Van Deusen and Tallman (1994) found that more than half of their sample of LMSs did not assess student work at all during the study period. Michie and Chaney (2000) found that the overall percentage of library media centers working with teachers on curriculum development, collaboratively teaching curriculum units with classroom teachers or collaboratively evaluating curriculum units with classroom teachers ranged from two percent to 21 percent, depending on the subjects taught. The greatest amount of collaboration was with reading or English teachers.

Mosqueda (1999) studied the roles played by LMSs in 67 Florida schools named as National Blue Ribbon Schools. While the overwhelming majority of responding principals and LMSs agreed that the library media programs performed well in program administration and information access and delivery, an average of 75 percent of principals and LMSs thought the library media programs needed to be more fully integrated into the curriculum. Mosqueda's data does show a higher percentage of LMSs who spend time planning instruction with teachers on a daily (40 percent) or weekly (80 percent) basis than other research studies cited, which may indicate that LMSs in exemplary schools perform the instructional role more often than their counterparts in less well-recognized schools.

Barriers to Collaboration

Barriers to LMSs practicing the instructional role include the attitudes of both LMSs and teachers, as well as program limitations such as fixed scheduling, limited resources, and lack of technology. Lai (1995) found no significant differences between teachers' and media specialists' attitudes regarding the LMS's role in curriculum development, instructional development and

technology use. Both groups believed the LMS had only a marginal role in designing and producing materials for units. Beaird (1999) found that key barriers to collaboration were time, desire to maintain the status quo, and lack of resources. In a national survey of LMSs by McCracken (2000), the biggest barriers cited to expanding their instructional role were lack of time and resources, specifically funding and clerical help. Several researchers (e.g., Slygh, 2000; Beaird, 1999; DeGroff, 1997) point to role confusion or role conflict of LMSs themselves, as well as lack of understanding of the instructional role of the LMS among the teachers and administrators they work with, as inhibiting expanded collaboration activities.

Positive Effects of Flexible Scheduling

Giorgis (1994) discovered that the majority of elementary school teachers perceived the LMS as a resource person and only a few as a collaborator. Nevertheless, during the course of her study Giorgis found that these views changed. Through flexible scheduling and collaborative planning, the perceptions of the LMS's role by classroom teachers, administrators, children and parents became one of teacher and collaborator.

Other researchers also attest to the positive effects of moving to flexible scheduling. Bishop (1992) found that the most significant changes in the role of the LMS occurred with the move to flexible scheduling and curriculum-integrated instruction. Fedora (1993) compared two exemplary school library media centers, one with fixed and one with flexible scheduling and found that the LMS participated more often in planning with teachers and as an instructional consultant in the flexibly-scheduled program. Van Deusen (1993) and van Deusen and Tallman (1994) found that LMSs in schools that combined both flexible scheduling and team planning had significantly more curriculum involvement. Hughes (1998), in her study of four library media programs in schools implementing whole language programs, found that all four LMSs moved to flexible scheduling in the LMC during the course of implementation and were able to provide leadership and direction in creating a library program that promoted the active construction of knowledge. Likewise, Beaird (1999) reported that one of the major enhancers to increased collaboration was flexible scheduling, and McCracken (2000) found that LMSs who use flexible scheduling perceived that they implemented the role of instructional consultant more than those who used fixed or combination scheduling.

Positive Effects of Collaboration

Research indicates that a collaborative environment begets more collaboration. Beaird (1999) discovered that as a result of a first experience with collaboration with the LMS, teachers were made aware of the presence of another professional on their campuses who could engage in collaborative planning and teaching. LMSs became more aware of teachers' needs as they provide for regular students as well as those with special needs. Straessle (2000), in her case study of a suburban junior high school, concludes that the more teachers and administrators understand and experience the role of the LMS as an instructional consultant, the more likely their perceptions will change and expectations increase, thus improving teacher instruction and student learning. Slygh (2000) reports that LMSs' perceptions of the degree to which their school climate was a professional community affected the amount of instructional collaboration they performed.

Positive Effects of Technology

Technology can also support the instructional role. Everhart (1992) found that high school library media specialists with automated circulation systems spent significantly more time in instructional development and use of technology than those without automated systems, although the actual time spent in development of the educational program was quite low. Van Deusen (1996a) found that both flexible scheduling and library automation were positively related to the LMS performing an instructional consultation role, as well as providing electronic support for teachers using technology, providing individual assistance to students, and reducing the amount of time spent on clerical duties. Jones (1994) concluded that technology expands the teacher-librarian partnership possibilities in literature-based instruction. E. W. Smith (1998) studied the changes occurring in media centers in Dekalb County, Georgia after the incorporation of technology, and found both that the media center program was a viable component of the school's curriculum and that the media specialist's role as teacher, information consultant, and information specialist had expanded.

Characteristics of Library Media Specialist

Perhaps the most important factor in successfully implementing the instructional role is the characteristics and skills of the school library media

specialist himself or herself. Yetter (1994) found that LMSs successfully involved in resource-based learning were energetic, healthy and enthusiastic; showed leadership abilities; had theoretical understanding of resource-based learning; had the ability to translate theory into effective instructional plans; and were knowledgeable about specific learning resources. These LMSs saw teaching as their primary function. As a result, the colleagues of these LMSs saw them as vital participants in the instructional process. Esser (1999) interviewed 18 female LMSs in Kentucky to discover their initial motivations for entering the field and discovered that a desire for autonomy was high on the list. Her data suggested that these teacher-librarians achieve a greater degree of autonomy when they are collaborating with teachers, and they negotiate these relationships and create effective networks in order to carry out their work.

Farwell (1998) found that LMSs could play a pivotal role in the successful implementation of collaborative planning if they were knowledgeable about the curriculum, the library collection, information literacy instruction, and instructional design and delivery. They also needed to have good interpersonal skills and be willing to act as change agents. Van Deusen's (1996b) case study of a school library media specialist involved in an instructional planning process showed that she contributed as a peer and helped to clarify, initiate, summarize and test the discussion ideas. DeGroff (1997) concludes from her survey data that the most important factors supporting opportunities for teachers and LMSs to work together effectively were the librarian's knowledge, personality, and attitudes or interests.

K. G. Alexander (1992) studied four exemplary LMSs and found that they fulfilled most of the aspects of the instructional role. They spent large portions of each day giving instruction, effectively managed class and teaching time, provided instruction related to the curriculum, and used innovative instructional methods. They also instructed different sections of the school community, ensured that their media center had resources to support the changing curriculum, and assisted teachers in planning classroom instruction. Gehlken (1994) studied the school library media programs in three blue ribbon high schools and came to similar conclusions. In all three schools, there was a cooperative relationship between the LMS and the faculty, with opportunities for collaborative planning and integrating information skills into the classroom curriculum. The students in all three schools overwhelmingly indicated that the most important service provided by the school library media program was help from the LMS in finding and evaluating information. Bell and Totten (1992) found that teachers employed in academically successful schools tended to choose the library

media specialist significantly more for cooperation on instructional problems than did teachers serving in academically unsuccessful elementary schools.

Other Aspects of the Instructional Role

Another aspect of the LMS's learning and teaching role identified in **Information Power** (1998) is to encourage and engage students in reading, viewing, and listening for understanding and enjoyment. Yetter (1994) found that LMSs involved in resource-based learning were enthusiastic about reading and books. Lai (1995) found that teachers and LMSs both strongly agreed that the LMS should work with teachers in helping students to develop the habit of reading.

In Australia, Todd, Lamb and McNicholas (1993) studied Year-Seven and Year-Eleven students and found that integrating information skills into subject content, with collaboration by classroom teachers and LMSs, had a positive impact on student learning, including better understanding of subject content and improved test scores. Todd (1995) analyzed the impact of integrated information skills instruction in a Year-Seven science class. The two treatment classes recorded significantly higher annual science scores than the control classes.

The adoption of state content standards and the movement towards standards-based instruction and assessment is too recent to have a substantial research base as yet. N. A. Alexander (1998) determined that standards policy is generally associated with improved student performance, although there are disturbing equity issues. In the school library field, a few research studies to date have looked at the connection between integrating information literacy skills into the curriculum and improved student learning. Grover and Lakin (1998) reported on the development and testing of a Kansas model which integrates information skills into planning and assessing learning across the curriculum. Teachers and librarians who participated in the study indicated that the model facilitated student learning in all grade levels studied and for units of any length. The "integrated assignment" stage of the model was reported as a key to enhancing student learning.

In regard to standards-based education, one of the more interesting developments of the past decade has been the elaboration and proliferation of the value-added assessment model originated in Tennessee by Sanders, et. al. (1997). This model is being considered in Colorado and other states as a method for evaluating the performance of both schools and teachers.

In the author's most authoritative account to date, he reports that the strongest predictor of year-to-year improvement in students' test scores is teacher quality. To date, however, there have been no further reports from Sanders or others defining precisely what "teacher quality" means in empirical terms. Decades of library media research findings indicate that one major factor that has demonstrated consistently a positive, strong, and statistically significant relationship to quality teaching is a close working relationship between the classroom teacher and the library media specialist.

Information Access and Delivery

The information access and delivery role includes providing quality resources and technology that support the curriculum, offering convenient and flexible access to the media center's resources and services, and providing a welcoming environment that is conducive to learning. Recent studies show that LMSs still perceive this role to be their most important one, and the one they practice most often in reality (DeGroff, 1997; McCracken, 2000).

Early studies focused on service level and collection size as predictors of academic achievement. Greve (1974) discovered that the most valuable predictor of student test scores was the number of volumes in the school library. Thorne (1967) examined the reading comprehension and library skills of students using the augmented services of a Knapp Project library versus the nominal services of a second junior high school library in a two-year study. Findings revealed a significant difference in the mean gains of the experimental group over the control group in reading comprehension and library skills.

Access to Print Resources

More recent studies have focused on the connection between students' achievement in reading and access to print resources, particularly in libraries. The first Colorado study by Lance, Welborn and Hamilton-Pennell (1993) concluded that the size of a media center's staff and collection is the best school predictor of academic achievement. In that study, academic achievement was represented by reading scores, which were highly correlated with scores in other areas, such as writing and research skills. Elley (1994, 1996) compared the scores of students from 32 countries on the 1992 International Association for the Evaluation of Educational

Achievements (IEA) Reading Literacy Study with data on the home environment and school and public libraries. He concluded that access to print, and especially the size of the school library, was the strongest predictor of reading achievement. Froese (1997) compared the IEA reading scores for British Columbia with variables related to school and classroom libraries and found that students who have the opportunity to borrow books from libraries have a considerable achievement advantage over those who cannot.

In his meta-analysis of reading research studies, Krashen (1993) concluded that more free voluntary reading results in better reading comprehension, writing style, vocabulary, spelling and grammatical development. He also determined that when books are readily available and the print environment is rich, more reading is done. Even second-language learners will be more successful in language acquisition when they read more in the second language. Children get a substantial percentage of their books--from 30 to 90 percent--from school, classroom and public libraries. They also read more when they have a comfortable, quiet place to read, such as the school library. Ramos and Krashen (1998) concluded that simply providing interesting books to children is a powerful incentive for reading, perhaps the most powerful incentive possible.

McQuillan (1997) drew similar conclusions. He found that access to print via the home, school and public library, and frequency of free reading accounted for nearly 80 percent of the variance in fourth grade reading test scores. He also reported a correlation between school and public library quality, library use, and amount of reading done by school children. In McQuillan's (1998) meta-analysis of literacy studies, there was considerable evidence that the amount and quality of students' access to reading materials is substantively related to the amount of reading they engage in, which in turn is the most significant determinant of reading achievement. More reading leads to better reading achievement.

Other researchers have also demonstrated a relationship between free voluntary reading and academic achievement. Digiovanna (1994) found that the amount of recreational reading was positively correlated with higher academic achievement levels for third, fifth, and seventh graders. Halliwell (1995) demonstrated a relationship between eighth graders' self-perceptions of being free voluntary readers and the degree of their success on the Missouri Writing Assessment. Lipscomb (1993) reported on the self-selected recreational reading of first through third-graders over a nine-week period in the summer and found that the total number of words read was a significant predictor of students' overall reading achievement and word recognition.

Access to print through public libraries has been shown to contribute to students' academic achievement. A Library Research Service study (no. 153, 1998) reported that in Colorado school districts scoring in the highest third on the 1997 Colorado State Assessment reading test, circulation of children's materials per capita by public libraries was 50 percent higher than in school districts scoring in the lowest. There were similar results for states scoring highest on the NAEP reading test. Ramos and Krashen (1998) reported that even one classroom trip per month to the public library had a positive impact on students' reading. McQuillan (1997) found that SAT scores were positively correlated with per capita public library circulation.

School-Public Library Relationship

A Library Research Service study (no. 150, 1998) reported that students are likely to earn higher reading scores if there is a relationship between the library media program and local public libraries. Such a relationship might include public library staff presenting booktalks at the school library, and the local public library providing a summer reading program. Similarly, Lance, Hamilton-Pennell and Rodney (2000a) found that Alaska students' test scores tended to be higher when the LMC had a cooperative relationship with the public library. Michie and Chaney (2000) reported that 60 percent of LMCs participated in some type of cooperative activity with a local public library, including borrowing materials for teachers or the LMC, informing the public library of curriculum or homework needs, and coordinating class visits to the public library.

School Library and Equity Issues

Several researchers point to the potential importance of the school library as a factor in equalizing access to print resources for disadvantaged children. McQuillan (1997, 1998) found a strong negative correlation between poverty and print resources at home. He concluded that school and public libraries could help increase access to print for low-income communities and schools, thus improving their students' reading achievement. The survey data collected by Baughman (2000) suggest that children from a lower socioeconomic stratum who have a school library program obtain a higher mean test score than similar children from schools without such a program.

Halle, Kurtz-Costes and Mahoney (1997) reported that the number of books in the homes of low-income, African-American children was related to children's reading scores at the end of the following year. They concluded that providing access to children's books through libraries may be one of the most important things disadvantaged communities and schools can do. McQuillan (1998a) studied the public library use of language minority students and found that Spanish-speaking households are much less likely to have access to books, and, therefore, fewer opportunities to further literacy development. He concludes that both public and school libraries must make concerted efforts to reach out to language minority parents and their children. Godina reports that Mexican-background students demonstrate different literacy practices in their homes and communities than those acknowledged at school, where they are viewed as having limited English proficiency and enrolled in low academic tracks. The local public library becomes an important locale for these students' literacy learning because it provides culturally-relevant reading materials.

Unfortunately, school libraries often appear to reflect the economic conditions of their communities. Krashen and O'Brian (1996) reported that socio-economic status was the most powerful predictor of student reading achievement in the Los Angeles Unified School District. Both Krashen (1996) and McQuillan (1998) made the point that the low student reading scores in California could be traced to the deplorable state of its school and public libraries. Allington, Guice, Baker, Michelson, and Li (1995) studied the variations in access to books in school libraries in twelve high- and low-income neighborhoods. They discovered that high-income schools had 21.5 books per student, whereas the low-income schools had 15.4 volumes. They also discovered disparities in number of magazine subscriptions, size of classroom libraries and access policies. McQuillan, LeMoine, Brandlin and O'Brian (1997) studied access to school libraries and found that students in high-achieving schools serving largely middle-class children provided greater access to books, more time to read in school, and more liberal circulation policies than those from lower-achieving schools in largely low-income neighborhoods. Smith, Constantino and Krashen (1996) found, not surprisingly, that school libraries in high income communities such as Beverly Hills had around three times as many books per student as school libraries in low-income communities such as Compton and Watts. Public libraries in high-income communities also had about twice as many books as those in low-income communities.

Two recent studies reinforce these conclusions. Duke (2000) studied 20 first-grade classrooms from very low- and very high-socioeconomic status (SES) districts. Data indicated substantial differences between low- and

high-SES classrooms in all major areas examined--amount of print experienced, type of print experienced, and number of print-related activities. Neuman and Celano (2001) focused on the neighborhood settings in which literacy begins for young children, and the extent to which literacy is a potential factor contributing to differences in achievement. What they found was striking. Access to print resources, including children's books available for purchase, public areas where children might observe people reading, and the size and quality of book collections in local childcare centers, school and public libraries, varied dramatically between the neighborhoods of middle- and low-income children. Children from middle-income neighborhoods were likely to be deluged with a wide variety of reading materials, while children from poor neighborhoods would have to "aggressively and persistently seeks them out." These children would have to rely on public institutions, which provided unequal resources. School libraries in these neighborhoods were in serious disrepair.

A case study of a Library Power elementary school in Chattanooga (Oberg, 1999) shows that the library media program can make a difference in a low-income school. Lakeside Elementary School, largely composed of low-income African-American children, improved LMC collections and facilities, developed collaborative planning between teachers and librarians through professional development; provided flexible scheduling to the LMC; and hired a full-time LMS. The school experienced dramatic improvements in student learning, as evidenced by scores on the TCAP (Tennessee Comprehensive Assessment Program), that are attributable at least in part to the Library Power Initiative.

Size of Library Media Center Collection

Size of the school library collection has been shown to be a positive predictor of student academic achievement (Greve, 1974; Lance, Welborn and Hamilton-Pennell, 1993; Elley, 1996). Baughman (2000) and Lance, Rodney and Hamilton-Pennell (2000b) found that the per pupil book count was correlated with higher test scores. Lance, et al, (2001) also found that Oregon reading test scores rose with increases in print volumes per student and periodical subscriptions per 100 students. Krashen (1995) found that a significant predictor of NAEP reading comprehension test scores was the number of books per student in school library media centers. Similarly, McQuillan (1997) reported that SAT scores were positively correlated with the number of books per student in the school library. Krashen and O'Brian (1996) did not find a significant relationship between books per student and

student achievement in the Los Angeles Unified School District. They postulated that the number of books in a school library has little effect on literacy if access to them is restricted, the books are badly out of date, and students do not know where they are, as is the case in many California school libraries.

Frequency of School Library Use

Frequency of library use has also been positively linked to student achievement scores. Baughman (2000) found that students at each grade level score higher when there is increased use of the LMC and more open hours at the library. Koga and Harada (1989) investigated the attitudes of students in Australia, Japan, Korea and Thailand towards school libraries and found that students with a keen attitude toward learning tended to use the library more often and demonstrated better academic achievement. The LMS at Lakeside Elementary School, a Library Power elementary school in Chattanooga (Oberg, 1999), found a direct relationship between the number of times students had been in the library and the level of their test scores in reading comprehension and reference skills. A Library Research Service report (no. 149, 1998) showed that states with above average reading scores on the 1994 NAEP reading test have schools where students visit the school library media center more frequently and borrow more books and other materials.

Flexible scheduling appears to support more frequent library use by individual students. Fedora (1993) found that in a flexibly scheduled library media program, students have more frequent access individually and in small groups than in a fixed-schedule program, where nonscheduled use is rare. Van Deusen (1996b) reported that instances of the LMS providing individual assistance to students was higher in flexible than fixed schedule situations. Lance, Rodney and Hamilton-Pennell (2000b) found that middle schools with high test scores tend to have LMCs that report a higher number of individual visits to the LMC on a per-student basis.

The extent to which flexible scheduling occurs in library media centers varies by type of school and educational level. According to recent survey results (Michie and Chaney, 2000), 95 percent of public secondary school library media centers and 60 percent of public elementary school library media centers (70 percent total) report that they use flexible scheduling, although it is most often used in combination with regular scheduling as well. Mosqueda (1999) reports a similar figure, with 75 percent of the LMCs of the

reporting National Blue Ribbon Schools operating on a flexible schedule. Abdoler-Shroyer (1999) reports that in her population of Missouri's combined K-12 schools, 88 percent of the districts responding used the LMC for teacher released time at the elementary level, with 87 percent seeing students on a fixed schedule. At the high school level, 83 percent schedule high school classes on a flexible basis.

Role of Library Media Specialist in Program Development

The role of the LMS in developing and providing access to the library media program has received a fair amount of attention in the research. Pembroke (1997) found that, when school librarians provide reading guidance or a bibliography, reluctant fifth grade readers can be motivated. Other motivating factors included access to the library and books; an adequate collection of print and non-print materials; and an inviting environment. Martin (1996) found that as library services increased (including reference, information skills, curriculum integration, interlibrary loan, reading guidance, and technical assistance), third grade test scores also increased. She found a statistically significant relationship among all the library media center variables (collection size, expenditures for the collection, staffing, and services) and overall achievement in grades 3, 5, and 11, indicating that the whole is greater than the sum of its parts. A Library Research Service study (no. 150, 1998) reported that students are likely to earn higher reading scores if there is a collection development policy for the school library media center. Lance, Hamilton-Pennell and Rodney (2000) also found that Alaska students' test scores tend to be higher when the LMC has a strong collection development policy.

K. G. Alexander's (1992) study of four exemplary media specialists found that they all provided continuous access to their media centers; assisted individual users; designed flexible circulation policies; used innovative methods to promote their media centers; and developed media center collections which supported all areas of the curriculum. Gehlken (1994) reported that in all three blue ribbon high schools studied, the LMS flexibly scheduled classes; organized and cataloged the collection; provided an inviting climate conducive to learning; assisted students in traditional and electronic methods of information access; and involved faculty in the selection of materials. The media centers in all three schools were organized, automated, easily accessible, and provided materials in a variety of formats across all levels and subject areas. The media center facilities were inviting, aesthetically pleasing, safe, and user-friendly.

Role of Technology in Student Academic Achievement

The role of technology in promoting student achievement has been the focus of several recent studies. In their review of educational technology research, Sivin-Kachala, Bialo, and Langford (1997) concluded that using technology has a positive effect on student achievement, attitudes toward learning, and student self-concept. Silverstein, Frechtling and Miyaoka (2000) found that technology usage had a small but significant impact on Illinois students' achievement, particularly at the higher grade levels, specifically eleventh grade science. Paul, VanderZee, Rue and Swanson (1996) reported that using the Accelerated Reader technology-based literacy program had a positive affect on student academic performance and attendance rates, especially for socio-economically disadvantaged children in urban areas. Peters (1998), on the other hand, found no significant difference in reading achievement when students used the technology-based Electronic Bookshelf Program.

Wenglinsky (1998) found a positive correlation between computer use and academic achievement in mathematics, but only if computers were used to convey higher-order skills or engage in learning games. Use of computers for drill and practice, the lower-order skills, was negatively related to academic achievement for both fourth and eighth grade students. Significantly, disadvantaged groups had less access to those aspects of technology that positively affected educational outcomes. Page (1999) reported that the presence of classroom technology had a positive effect on the mathematics achievement of low socioeconomic elementary school students, although reading achievement remained inconclusive.

DeFrieze (1998) found that reading achievement appears to be more influenced than mathematics achievement by the use of computers, particularly in an unstructured environment. She speculates that in an unstructured environment teachers have more control over the programs each student accesses, which may be the key to influencing students' higher achievement in reading. A significant finding by Bohannon (1998) is that high frequency of school computer use results in students earning significantly higher mean scores on reading achievement tests. This is true for males and females, as well as high and low socioeconomic groups. She concludes that frequent use of computers requires more continuous reading practice, regardless of the activity.

Integrating Technology into the Library Media Center

There is perhaps no place where the library media specialist's role has changed more in the last ten years than in the integration of technology. Person (1993) reported that LMSs don't see a separate, organized technological media role for themselves, but see technology as a means to accomplish the goals and missions of the media center program as expounded in **Information Power** (1988). A Library Research Service report (no. 141, 1998) concluded that students earn higher reading scores if their school library media programs incorporate the latest information technology. Such technology includes a district-wide catalog, access to online databases, resources available through a local-area network, and access to the World Wide Web and the statewide library network. Lewanski (1998) showed a statistically-significant correlation between the use of computer-assisted library research and improvement in overall critical thinking skills. The control group, using a traditional paper-based process did not show such a relationship.

Lance, Rodney and Hamilton-Pennell (2000a) found that Pennsylvania students' test scores increase as LMSs spend more time managing information technology. Students also earn higher reading test scores in both Pennsylvania and Colorado (Lance, Rodney and Hamilton-Pennell, 2000b) where networked computers link school libraries with classrooms, labs and other instructional sites, enabling access to LMC resources, licensed databases and the Internet. Alaska students' test scores tend to be higher when the LMC is equipped to provide access to the Internet (Lance, Hamilton-Pennell and Rodney, 2000).

An Illinois study (Silverstein, Frechtling and Miyaoka, 2000) revealed that almost all Illinois schools are now connected to the Internet. McCracken (2000) found that 99% of high school LMCs, 95% of middle school LMCs, and 84% of elementary school LMCs had Internet access. Nevertheless, access to technology in school library media centers still varies widely. Powell's (1998) survey of 300 elementary and secondary school library media centers in Tennessee revealed a wide variability in technology access. McCarthy (1997) found that less than 50 percent of the New England school library media centers in her sample had automated circulation and cataloging systems, and these were mostly in middle and high school libraries. McCracken's figures (2000) show that the percentage of LMCs with online catalogs ranged from 60% in elementary schools to 84% in high schools. She also reported that LMSs perceive that integrating technology

into the LMP is more important than the extent to which they perceive they have actually implemented it into their practice.

High-achieving schools tend to have more technological resources. Baule (1997) found that schools with exemplary technology were also more likely to have high-quality school library media programs. Yetter (1994) observed that the library media centers in successful resource-based learning schools had modern, spacious facilities designed for flexible use and access to technology. Gehlken (1994) noted that all three blue ribbon schools studied had library media centers which were committed to increasing student access to technology, and which had the flexibility and electronic capabilities to accommodate the changing needs created by new technologies. Students identified the electronic catalog, computer printer workstations and copying machines as some of the most important services provided by the library media program.

As Wenglinksy (1998) and DeFrieze (1998) demonstrated, it is not the amount of technology or computer use that counts in promoting student achievement, but how it is used. Many researchers (for example, McQuillan, 1996; Lance, Welborn and Hamilton-Pennell, 1993) have found no correlation between reading achievement and amount of computer software available. Technology must be integrated into the school library media program to influence academic achievement. An elementary school in California with a high Latino population (Ferguson, 2000) saw student achievement gains that were attributed to the technological upgrade of the LMC. Reading scores rose 8% from the previous year after the school hired a professional LMS who refurbished the LMC's technological resources and added reading literacy programs such as Accelerated Reader and the S.T.A.R. Reading testing program.

Program Administration

The program administration role involves effective management of the human, financial and physical resources of the library media program. This role also provides leadership within the larger learning community. Adequate staffing, budget, and administrative support are key to the success of this role. When all these factors are maximized, research studies show a dramatic impact on student achievement.

Maximizing Predictors of Student Achievement

Lance, Rodney and Hamilton-Pennell (2000b) found that when all LMC predictors of students achievement (i.e., staffing, expenditures, information resources and technology) are maximized, Colorado reading test scores tend to run 18 percent higher in the fourth grade and 10 percent higher in the seventh grade. In Pennsylvania (Lance, Rodney and Hamilton-Pennell 2000a), reading test scores tend to run 10 to 15 points higher when LMC predictors (i.e., staffing expenditures, information resources and technology, and information literacy activities of library staff), are maximized. In Alaska elementary schools with well-developed library media programs, 86 percent of students scored proficient or above on state reading tests compared with 73 percent of students in schools with less well-developed media programs (Lance, Hamilton-Pennell and Rodney, 2000). In Oregon, Lance, Rodney, and Hamilton-Pennell (2001) concluded that whatever the level of a school's library program, incremental improvements in its staffing, collections, and budget will yield incremental increases in reading scores. They also found that test scores rose when LMSs spent more time attending faculty meetings, meeting with library media staff at the district level, and meeting regularly with the principal.

Principal Support of the Library Media Program

Yetter (1994) found that schools that had successfully implemented resource-based learning had a common understanding and support from the principal, teaching faculty and library media specialist about the centrality of the library media program in the school's instructional process. These schools provided planning time for teachers and library media specialists to work collaboratively, clerical support for the LMS, flexible scheduling in the library media center, and principal support of the library media program. Likewise, Farwell (1998) determined that in schools with successful collaborative planning, the principal served as an advocate for collaborative planning and information literacy instruction, and provided financial support for the library media program, adequate clerical staff, and time during the school day for LMSs and classroom teachers to plan together.

Mosqueda (1999) concluded that the most important finding in her study of school library media programs in Florida blue ribbon schools was the overall favorable perception of principals and LMSs in regard to the leadership role they played in their schools. The reported strengths of the library media programs in these schools supported the research on what constitutes an

exemplary program, including open access, administrative support, well-equipped facilities, technology integration, reading support, and good staffing. Gehlken (1994) reported that in all three blue ribbon high schools she studied, the principals actively supported and promoted the library media program. Standridge (1996) reported that student achievement in urban elementary schools was positively impacted by greater participation of the certified staff in school-based decision making, especially in the areas of goals, vision, mission, and curriculum and instruction.

There appears to be a two-way relationship between administrative support and LMSs performing the instructional role. In schools where there was fiscal and organizational support for the library media program, including automated systems and paid support staff, van Deusen (1996a) found that LMSs performed the instructional consultation role to a greater extent. Lumley (1994) concluded that instituting a curricularly integrated and flexibly scheduled library media program required leadership on the part of the library media specialist as well as principal support, resulting in strong leadership roles for the LMS in curriculum, instruction and staff development. Van Deusen (1996a) reports that the availability of support staff and automated library systems was positively related to LMSs' doing more consulting work with teachers and spending less time on nonprofessional tasks. McCracken (2000) found that the factors most frequently cited by LMSs as important to expanding their instructional role were support of the school administration and support of other teachers at the school.

Collaborative Activities of the Library Media Specialist

Lance, Rodney and Hamilton-Pennell (2000b) found that LMS involvement in collaborative activities has a direct impact on test scores. Higher levels of collaboration result from meeting with school administrators, serving on standards and curriculum committees, working with faculty at school-wide staff meetings, and meeting with library media staff at the building level. Data from Pennsylvania (Lance, Rodney and Hamilton-Pennell 2000a) reinforce the finding that test scores increase as LMSs spend more time serving on curriculum and standards committees. Hughes (1998) reports that LMSs who successfully participated in their schools' move to whole language became part of their school's leadership team, attended professional development workshops with teachers in the school, and spent more time pulling together curriculum-related resources in the library media center.

Effect of Library Media Center Staffing

Lance, Welborn and Hamilton-Pennell (1993) found that library media centers which have more endorsed staff tend to have staff who spend more time identifying materials for instructional units developed by teachers and more time collaborating with teachers in developing such units. They found that as the LMS's instructional role increases, the size of the library media center's staff and collection increases, which, in turn, is a direct predictor of student reading achievement. Martin (1996) also found a significant positive relationship between school library media center staffing and student achievement, especially in high school reading. Schools employing more media center staff had higher achievement test scores.

A Library Research Service study (no. 141, 1998) showed that student reading scores were higher in schools where there is a state-endorsed library media specialist and where the LMS is supported by an aide. This is unfortunately not yet the norm. Michie and Chaney (2000) report that as of 1997, public school libraries had an average of 0.9 professional staff (included non-certified professional staff) and 0.6 other paid employees, overall. Twenty-two percent of public schools lacked a full-time or part-time library media staff person who is state-certified. McCracken (2000) reported that the biggest barriers cited by LMSs to expanding their instructional role were lack of time and resources such as funding and support staff.

Studies in Alaska, Pennsylvania, Colorado, Massachusetts, and Oregon (Lance, Hamilton-Pennell and Rodney, 2000; Lance, Rodney and Hamilton-Pennell, 2000a; Lance, Rodney and Hamilton-Pennell, 2000b; Baughman, 2000; Lance, Rodney and Hamilton-Pennell, 2001, respectively) attest to the value of full-time, endorsed media staff. In Alaska, at both elementary and secondary levels, the presence of a full-time librarian was a very strong predictor of average and above achievement. Regardless of the level of librarian staffing, however, the more LMS staff time was devoted to delivering library and information literacy instruction to students and providing in-service training to teachers, the higher the test scores. Colorado reading scores increased with increases in LMS hours per 100 students (for seventh grade) and total staff hours per 100 students. Pennsylvania reading test scores increased with increases in LMS staff hours and support staff hours. In Massachusetts, at elementary and high school levels, students who were served by full-time LMSs had higher test scores than those in schools without full-time LMSs, and non-professional staff

assistance also made a positive difference in average test scores. Oregon reading scores rose with increases in total staff (both professional and support) per 100 students.

Library Media Specialist as Provider of In-Service Training

The involvement of a school library media specialist in technology-based staff training can support student achievement. Michie and Chaney (2000) report that in 1997, 43 percent of public school library media programs with access to the Internet arranged Internet training for teachers and 37 percent for administrators. In Colorado (Lance, Rodney and Hamilton-Pennell, 2000b), reading test scores increased with the amount of time LMSs spent as in-service trainers of other teachers. Alaska and Pennsylvania students' test scores tended to be higher when library staff spent time providing in-service training to teachers (Lance, Hamilton-Pennell and Rodney, 2000; Lance, Rodney and Hamilton-Pennell). Wenglinsky (1998) found that teacher's professional development in technology and the use of computers to teach higher-order skills were both positively related to academic achievement in mathematics and the social environment of the school.

Library Media Specialist Planning and Management Skills

School library media specialists in effective schools tend to have good planning, communication and management skills. Yetter (1994) observed that library media specialists in successful learning-based schools were expert in developing effective library media programs which were congruent with the state and national **Information Power** (1988) guidelines. The basic library procedures and processes in their library media programs functioned smoothly. A Library Research Service report (no. 150, 1998) indicated that students are likely to earn higher reading scores if there is a plan for the development of their school library media program. Gehlken (1994) reported that in all three blue ribbon high schools the LMSs took proactive steps to update students, teachers and administrators about new materials, technology, and services. Lumley (1994) concluded that instituting a curricularly integrated and flexibly scheduled library media program in an elementary school required LMS leadership in site-based staff development and good communication with staff and principal support.

Library Media Specialist Budgetary Role

A very important administrative role for the LMS is to obtain an adequate budget for the library media program. Angelo's (1994) study of Massachusetts school library media programs revealed that more than 90 percent were operating at the minimum level according to state standards in the areas of personnel, collection, and budget. Lancaster (1998) surveyed superintendents about their attitudes toward elementary LMSs. She reports that though there appears to be agreement on the importance of and role of the LMS, in concrete terms, they do not adequately fund or staff the program in many cases. Almost half of the superintendents spent less than two percent of their total budget on the LMC.

Lance, Welborn and Hamilton-Pennell (1993) found that students at Colorado schools with better funded library media centers tend to achieve higher average test scores, whether their schools and communities are rich or poor and whether adults in the community are well or poorly educated. Bruning (1994) also reported a positive relationship between student achievement measures and the proportion of a school district's budget spent on library materials, for both high- and low-income districts. Studies in both Colorado and Oregon (Lance, Rodney and Hamilton-Pennell, 2000b; Lance, Rodney and Hamilton-Pennell, 2001, respectively) found that student reading scores increased with increases in library media expenditures per student. Baughman (2000) reported that in Massachusetts, at elementary and middle school levels, average test scores were higher in schools with larger per pupil expenditures for library materials.

These findings are particularly significant since studies seeking a relationship between school spending as a whole and student performance have shown mixed results. Krashen (1995) found that expenditures for education did not affect reading comprehension scores, while Powell and Steelman (1996) did find that school spending was positively linked to state SAT and ACT performance. A review of over 400 studies of student achievement by Hanushek (1997) demonstrated that there is not a strong or consistent relationship between student performance and school resources after variations in family input are taken into account. Hedges, et. al. (1994) in their meta-analysis of studies of differential school inputs on student outcomes, show that a positive relationship between resources and educational outcomes does exist and is significant enough to be of practical importance. While there is no clear mandate for increasing school spending in general to support student achievement, the research does show that increasing expenditures for school library media materials has a positive effect.

A World Bank meta-analysis of funding studies (Acevedo, 1997?), indicated that differences in aggregate education budgets do not appear to have a tight association with learning outcomes, although class instructional time, school library resources and textbooks, and class frequency of homework are inputs positively associated with improved test scores. Based on this analysis, the PARE program (Programa para Abatir el Rezago Educative) provided increased resources (including library resources) to Mexican schools. Data indicate that on average, PARE assistance had a significant positive effect on learning outcomes in Spanish. Acevedo concluded that roughly doubling the school resources allocated per student overcame a 30% deficit in test scores among rural students.

Summary

The impact of school library media programs on academic achievement is well documented in the research literature. Studies demonstrate consistently that well-equipped, quality school library media centers that have professional staff involved in instruction contribute to the academic success of their students. Likewise, both higher order uses of technology and expenditures for library materials support student achievement. All three roles of the school library media specialist identified in **Information Power** (1998) lead to greater integration of the school library media program into the larger learning community and promote greater student achievement.

Methodologies

Sample

In 2000, New Mexico had 759 public schools. Of the 400 elementary schools serving fourth grade, 208—52 percent—participated in this study. Of the 177 junior high and middle schools serving eighth grade, 100—56 percent—chose to be included. Of the 152 high schools serving tenth grade, 72—47 percent—participated in this study. (See Table 1.)

Throughout this study, the participants were treated as three distinct samples, one for each tested grade. Table 1 reports the number in the sample for each grade and its proportion of the universe of all schools serving that grade.

Table 1. Comparison of the Study Sample and the Universe of All New Mexico Public Schools Serving Grades 4, 8 and 10, 2000

Grade	Number in sample	Number in Universe	Sample as percent of universe
4th	208	400	52%
8th	100	177	56%
10th	72	152	47%

Survey

The survey of school library programs focused on several sets of potential predictors of academic achievement. These included: LMC hours, LM staff and their activities, technology, LMC usage, LM resource collections, and finances.

Respondent Information

The questionnaire began with several items identifying the responding school—its name and address, grades served, and its school district—and the individual respondent—his/her name and title as well as telephone and fax numbers and e-mail address. All of this information was required to assess and address potential deficiencies in the initial response rate to the

survey. The grades served were especially important as they made it possible to determine which tested grades a school included.

Service Hours

The second part of the questionnaire contained items concerning the school library's hours of operation—both during and after school in a typical school week and in a typical week during summer months. It is expected that schools with higher test scores will be those with libraries that have longer hours.

School Library Staff

This part of the questionnaire contained items requesting the numbers of people and total person-hours worked by paid staff with different types of qualifications. As noted earlier, one of the most consistent findings of research about the impact of school libraries is the value of staffing them with individuals who are professionally trained for the job. Another consistent finding in past research is the importance of having support staff who free professionals to do their job.

Paid Staff Activities

Perhaps the most fundamental question examined by this study was the value of staffing school libraries with trained individuals who engage in particular professional-level activities. The synergy of these activities, proved to have considerable impact on test scores. While the original Colorado study found strong evidence for the importance of the library media specialist's instructional role, those findings were based on just two items—the number of hours library media staff spent identifying and providing materials for instructional units developed by teachers and planning instructional units with teachers. The 2000 New Mexico questionnaire included a much more comprehensive list of staff activities. Additional activities on this list included, among others, hours per typical week staff spent: providing library/information literacy instruction to individuals or groups; providing in-service training to teachers and other staff; and teaching collaboratively with classroom teachers. The rationale for asking practitioners to parse their time so many ways was to obtain more

specific insights about exactly what it is that library media specialists do that makes a difference in how students perform on achievement tests. Despite an absence of research at this level of detail, it seemed reasonable to expect that some activities would be more effective than others and that their effectiveness might vary by school level (elementary, middle, high school).

Computers with Access to Library Resources

A great deal of detailed information about library technology was collected by the next section of the questionnaire. Respondents were asked to identify numbers of school computers both in and under the jurisdiction of the school libraries and elsewhere in the school from which networked library resources may be accessed. Of those numbers, they were further asked to identify numbers of computers meeting various descriptions (e.g., with access to the library catalog, licensed databases, and the Internet).

School Library Usage

The next part of the questionnaire solicited statistics about how often students and staff (i.e., administrators, teachers, others) interacted with school library staff for different purposes, including library/information literacy instruction. This section also included items for circulation of library materials as well as counts of materials loaned to other libraries and obtained from outside the library (e.g., interlibrary loans, intra-district loans). Previous research and conventional wisdom indicate that school librarians who impact student performance are those who are most actively engaged with teachers and students alike, particularly more direct involvement in teaching and learning activities. Evidence from previous research also supports the assumption that students who read more—both for school purposes and voluntarily—do better on tests.

School Library Collection

Despite the increasingly critical role played by school library staff in the instructional process, what most people think of first when the school library is mentioned is its collection. This section of the questionnaire solicits an inventory of the collection by format, including traditional print sources (e.g., books, magazine and newspaper subscriptions), non-print items (e.g.,

videos, software packages, and other audio-visual materials), and the rapidly growing "electronic" sector (e.g., CD-ROM, laser disk, and online database subscriptions). Traditionally, conventional wisdom dictated that the larger the collection, the better. As electronic sources of information proliferate and the value of up-to-the-minute information increases, this assumption becomes more questionable. Another wildcard related to this issue is the age of library collections. A larger collection is not necessarily a better one, if it consists increasingly of deteriorating volumes containing obsolete information.

Annual Operating Expenditures for the School Library

Although few school libraries have budgets that include personnel costs, many have budgets for print and non-print materials, electronic access to information, and miscellaneous operating expenses. This section of the questionnaire asked for the total figure in whole dollars spent for these items.

Available Data

This study depends on demographic data that, whenever possible was obtained at the school or neighborhood level.

The New Mexico Department of Education provided data on both the number and the percentage of students eligible to receive free or subsidized school lunches in each school. The percentage of the student body eligible to receive school lunch assistance was then used as a school-specific poverty variable.

Each school's enrollment, subdivided by ethnicity, was provided by the New Mexico Department of Education. Categories included were Native American, Asian, Black, Hispanic, White and Other. Five of these variables, Native American, Asian/Pacific Islander, Black, Hispanic, and Other were then combined to determine the minority percentage of the school population. The school minority percentages were utilized in correlation analysis.

The educational attainment variable demonstrates the general level of education in the school's surrounding population. Educational attainment

data was extracted from the United States Census Bureau Web site. The variable refers to the percentage of people age 25 and over with a high school diploma or equivalency or higher.

Total school expenditure data on a district level were also provided by the State Department of Education. The per student expenditure amount was then accorded to each school within that district. Total school budget and per student expenditures were the only factors considered. There were no program breakdowns in such areas as Talented and Gifted or Vocational.

This study also took into consideration two key teacher characteristics, the percentage of teachers with a master's degree and the average years of service. These figures were also provided by the New Mexico Department of Education.

The test scores used as indicators of fourth and eighth grade students' academic achievement in this study are 1999-2000 scores on the Language Arts portion of the standards-based portion of the New Mexico Achievement Assessment Program. The standards-based results are reported by performance level, with proficiency settings determined by New Mexico educators against state content standards. Achievement indicators for tenth grade students were drawn from the 1999-2000 New Mexico High School Competency Examination. Here the building-level composite score provided by the state indicated the percentage of students passing all the sub-tests of the Competency Examination, including language arts, social sciences, reading, mathematics, science, and composition.

Statistical Significance

Statistical significance is an often-misunderstood concept. Usually, when a statistical finding is reported, the first question someone asks is "Is that figure significant?" In this context, the intuitive response is to question the magnitude or size of the figure or the difference between two figures. There are no statistical tests to determine if a difference between two groups is "big enough," particularly if the groups in question represent an entire universe of subjects rather than a sample.

Statistical significance is about reliability or consistency. When a sample is studied, instead of the entire universe (in this case, school libraries in New Mexico public schools), a pertinent question is "Are these results truly

representative of the universe, or would different samples yield dramatically different results?"

Throughout later sections of this report, statistical significance is reported as "p," as in "probability." Three common milestones for statistical significance are reported: "$p < .05$," "$p < .01$," and "$p < .001$." Respectively, these designations indicate that the probability of reported results being an accident or a coincidence is less than one in 20, one in 100, or one in 1,000. Conversely, these figures may be interpreted to indicate 95, 99, or 99.9 percent certainty that the results are representative.

Generally, the levels of statistical significance reported represent two-tailed tests—ones indicating the probability that the reported results might be either exaggerated or suppressed. In some cases, however, significance levels are based on one-tailed tests—ones indicating only the likelihood that results reported may be exaggerated.

Throughout this study, statistical significance is most often reported in association with Pearson product-moment correlation coefficients in bivariate correlation analyses.

Bivariate Correlation

In this study, bivariate correlation analysis served two purposes: 1) informing decisions about eliminating or combining variables, and 2) assessing the direction and strength of the relationship between two variables, such as the ratio of library media specialist staff hours to students and reading test scores.

Pearson's correlation coefficient (r) indicates the extent to which two variables change together on a scale of −1.00 to zero to 1.00. Negative values indicate that a decline in one variable is associated with an increase in another, while positive values indicate that two variables increase together. For each report of this statistic, there is a corresponding indication of its statistical significance. (See earlier discussion about interpreting statistical significance.) In addition to assessing the direction and strength of relationships, Pearson's r helped to determine if any data elements were so strongly associated as to be either unnecessary or problematic if used together. In some cases, this statistic provided the basis for decisions to combine variables. Such data reduction was deemed desirable as it focused and simplified the model to be tested.

The significance of a bivariate correlation may be tested on a one- or two-tailed basis. Two-tailed significance testing assumes that the direction of the presumed relationship is unknown, thus one wishes to assess the possibility of error in either direction. One-tailed significance testing assumes that the direction of the presumed relationship is known, making it necessary to assess the possibility of error in only one direction. Because previous research consistently indicates that the effects on academic achievement of the library media variables under study are positive, some relationships significant on a one-tailed basis, but narrowly not on a two-tailed basis, will be reported.

Factor Analysis

While correlation analysis examines relationships between pairs of variables, factor analysis establishes relationships among groups of related variables. This technique was particularly useful when two or more variables needed to be combined, but were measured on different scales (e.g., dollars and percentages).

Instead of reporting the correlation of each variable with each other variable, factor analysis helps to create composite factors by reporting factor loadings that indicate how strongly and in what direction each variable is related to a factor. A factor loading indicates how much weight is assigned to a given factor for a given variable. Factors on which a variable loads highly are closely related to that variable. At this stage, factor analysis was a more efficient method of confirming--and discovering--relationships among variables than comparing multiple relationships among pairs of variables.

Exactly how factor analysis works need not be understood. When sorted by factor, the results are easy to interpret, since a researcher can readily identify variables that load highly on a given factor. The researcher, however, must interpret what a factor represents and decide what to call it. The factor analysis technique will also generate a factor score based on a school's values on the variables that load on a factor. In several instances, closely related variables were replaced by a factor score.

Multiple Regression Analysis

Multiple regression was used to weigh the effects of library media variables relative to school and community variables as predictors of academic

achievement. This technique is especially useful in assessing complex relationships among several potential predictors, because it weighs the importance of each predictor variable while ruling out the effects of the others.

This application of multiple regression techniques is a path analysis because both research and practice suggest a certain cause-and-effect order among the variables. In this model, community variables precede school variables, and school variables precede library media variables. All three sets of predictors precede—and may affect directly and/or indirectly—academic achievement. Multiple regression is used to assess the strength and direction of each separate path from variable to variable. These relationships are reported as path coefficients (i.e., betas or standardized regression coefficients).

Correlation and factor analyses of the original data elements helped to refine the model. They provided the basis for decisions to eliminate redundant variables and combine those that were so closely related as to produce statistical "static." In a path analysis via multiple regression, such "noise" complicates a model unnecessarily and suppresses the effects of other predictors statistically.

It is very important to note that this type of analysis makes two kinds of assumptions. It assumes causal order. The presumed cause-and-effect order in this model is suggested by previous research and practical experience. It is intuitively obvious that the status of library media centers may depend on more general school circumstances, just as they, in turn, may be driven by community conditions. It is equally apparent, however, that each of these sets of variables may affect academic achievement either directly or indirectly via some other variable not represented in this model.

An assumption of causal closure supposes that no critical variables are omitted from the model. This assumption is addressed as fully as was practically possible by this study. Without apology, its focus is on assessing the impact of school library media centers on academic achievement. The community and school variables included represent major antecedent conditions that might explain away that impact. For instance, the possibility that a correlation between the level of library media (LM) staffing and test scores might be a spurious result of generally high levels of staffing in a school was addressed by including the teacher-pupil ratio. Similarly, the possibility that a correlation between time spent by LM staff on library/information literacy instruction and test scores might be a spurious result of community affluence or socio-economic advantages was addressed by considering several alternative measures of those variables. Likely predictors of academic achievement for

which data are not available include parental involvement in a student's education, extra-curricular activities of students, characteristics of school curricula, and pedagogical techniques of teachers. Nonetheless, no relationships between such likely predictors and the level of development of LM programs are anticipated.

Because the original number of variables was large, it is assumed that an acceptable degree of causal closure was established. Nonetheless, Multiple R Square (R^2) is taken as a sufficient statistical indicator of the extent to which the model may not be causally closed. This statistic indicates the percentage of variation in test scores which is explained by a given group of predictors.

Separate analyses were conducted for elementary, middle, and high school levels. In each case, multiple regression was used to generate initial path coefficients. Variables whose path coefficients were less than .10 and which were not statistically significant at at least the .05 level (generally accepted standards) were automatically eliminated from the analysis.

Findings

Utilizing the combination of statistical techniques described above, both direct and indirect relationships between school libraries and academic achievement were explored. The findings concerning both types of relationships are presented by school level. Then, the impact of school libraries on academic achievement is examined more closely, taking into account other school and community conditions that make up the often complex environment in which New Mexico's school libraries operate.

Elementary School Level

At the elementary school level, library variables demonstrate positive and statistically significant relationships to reading scores, some of which are direct and some of which are indirect.

School Library Predictors of Achievement Scores

In New Mexico elementary schools, fourth grade achievement scores tend to rise with increases in

- the total number of library staff;
- the percentage of their time school librarians spend managing computer networks;
- numbers of computers in the school that provide access to the library catalog, licensed databases, and the Internet;
- the number of print volumes in the school library; and
- the number of electronic reference sources relative to students. (See Table 2.)

Table 2. Direct School Library Predictors of Fourth Grade Achievement Scores in New Mexico Elementary Schools, 2000

Variable	Correlation coefficient (r)	Statistical significance (p)
Library Staffing		
Total number of staff	.167	.017
Staff Activities (Percent of Weekly Hours)		
Managing computer network	.158	.029
Information Technology		
Internet computers in school	.185	.014
Catalog computers in school	.159	.031
Database computers in school	.222	.003
Information Resources		
Print volumes	.332	.000
Electronic references per 100 students	.163	.028

Information Technology

Fourth grade test scores rise with the level of library-related information technology in New Mexico elementary schools. In turn, elementary schools with more such technology tend to have:

- more school librarians who work more hours per week; and
- school librarians who spend more time each week meeting with their principals, providing in-service training to teachers, and providing reading incentive programs to students. (See Table 3.)

Table 3. Indirect School Library Predictors of Fourth Grade Achievement Scores via Information Technology in New Mexico Elementary School Libraries, 2000

	Information Technology		
Variable	Internet computers in school	Catalog computers in school	Database computers in school
Library Staffing			
Number of school librarians	.157*		
Weekly librarian hours	.182*		.185*
Staff Activities (Weekly Hours)			
Meeting with principal			.181*
Providing in-service training	.276*	.367*	.406*
Providing reading incentive programs	.177*		

* $p < .05$

Information Resources

The achievement test scores of New Mexico fourth graders improve with the size of library collections in elementary schools. Elementary schools with larger print collections and access to more electronic resources tend to have:

- more school librarians who work more hours per week, and
- higher levels of staffing generally, including more support staff who work more hours per week. (See Table 4.)

Table 4. Indirect School Library Predictors of Fourth Grade Achievement Scores via Information Resources in New Mexico Elementary School Libraries, 2000

Variable	Print volumes	Electronic references per 100 students
Library Staffing		
Number of school librarians	.238**	
Weekly librarian hours	.324**	
Total staff per 100 students		.190*
Total staff hours per 100 students		.292**

* p < .05, ** p < .01

Middle School Level

At the middle school level, library variables demonstrate positive and statistically significant relationships to achievement scores--some direct, some indirect.

School Library Predictors of Achievement Scores

In New Mexico middle schools, eighth grade achievement scores tend to improve with increases in

- the number of weekly hours the school library is open;
- extra time spent by library staff on selected activities, including: planning with teachers and providing them with in-service training, developing library collections and creating incentives for students to read, and managing school computer networks;
- the number of print volumes in the library's collection; and

- the number of library computers that provide access to licensed databases. (See Table 5.)

Table 5. Direct School Library Predictors of Eighth Grade Achievement Scores in New Mexico Middle Schools, 2000

Variable	Correlation coefficient (r)	Statistical significance (p)
Library Hours		
Weekly hours school library open	.196	.052
Staff Activities (Weekly After-School Hours)		
Planning with teachers	.295	.023
Providing in-service training to teachers	.252	.055
Providing reading incentive programs	.251	.055
Developing library collections	.255	.052
Managing computer networks	.283	.030
Information Resources		
Print volumes	.298	.006
Information Technology		
Database computers in school library	.251	.013

Print Volumes

Eighth grade achievement scores increase with the number of print volumes in middle school library collections. Middle schools with larger print collections tend to have:

- longer weekly hours of operation,
- more librarian and total weekly staff hours, and
- librarians who spend more hours per week teaching cooperatively with classroom teachers. (See Table 6.)

Table 6. Indirect School Library Predictors of Eighth Grade Achievement Scores via Print Volumes in New Mexico Middle School Libraries, 2000

Variable	Correlation coefficient (r)	Statistical significance (p)
Library Hours		
Weekly hours open	.210	.050
Library Staffing		
Weekly librarian hours	.306	.004
Weekly total staff hours	.301	.005
Staff Activities (Weekly Hours)		
Teaching cooperatively	.271	.012

Database Computers

Eighth grade achievement scores also increase with the number of library computers that can be utilized to access licensed databases. Middle schools with more library computers that can access licensed databases tend to have:

- more school librarians who work more weekly hours, and
- who spend more weekly hours teaching cooperatively with classroom teachers. (See Table 7.)

Table 7. Indirect School Library Predictors of Eighth Grade Achievement Scores via Database Computers in New Mexico Middle School Libraries, 2000

Variable	Correlation coefficient (r)	Statistical significance (p)
Library Staffing		
Number of school librarians	.264	.009
Weekly librarian hours	.313	.002
Staff Activities (Weekly Hours)		
Teaching cooperatively	.323	.001

High School Level

At the high school level, library variables demonstrate positive and statistically significant relationships to achievement scores, both direct and indirect.

School Library Predictors of Reading Scores

In New Mexico high schools, tenth grade achievement scores tend to improve with:

- the general level of library staffing;
- the extent to which classroom teachers and librarians teach cooperatively;
- the frequency with which both individuals and groups visit the school library, especially—in the case of groups—for information literacy instruction;
- the availability of library computers to students, particularly computers that provide access to the library catalog and the Internet; and

- the size of the library's collection, including its numbers of books, videos, and software packages, and spending on such items. (See Table 8.)

Table 8. School Library Predictors of Tenth Grade Achievement Scores in New Mexico High Schools, 2000

Variable	Correlation coefficient (r)	Two-tailed statistical significance (p)
Library Staffing		
Total weekly staff hours per 100 students	.239	.046
Staff Activities (Percent of Weekly Hours)		
Teaching cooperatively	.265	.032
Library Visits		
Group visits per 100 students	.229	.058 *
Group information skills instruction per 100 students	.292	.014
Individual library visits per student	.225	.059 *
Information Technology		
Library computers per 100 students	.297	.012
Library Internet computers per 100 students	.318	.007
Library catalog computers per 100 students	.255	.036
Information Resources		
Print volumes	.214	.092
Videos per 100 students	.340	.004
Software packages per 100 students	.312	.012
Library expenditures per student	.232	.057 *

*Achieves one-tailed statistical significance at $p < .05$.

Library Visits

Tenth grade achievement scores improve with numbers of individual and group visits to school libraries, especially group visits for information literacy instruction. High school libraries tend to be visited more often when they have:

- more librarian hours and more staff who work longer weekly hours,
- librarians who spend more of their time attending faculty meetings and serving on key school committees,
- more library computers that provide access to the library catalog and the Internet, and
- larger video and software collections and higher spending on collections generally. (See Table 9.)

Table 9. Indirect School Library Predictors of Tenth Grade Achievement Scores via Visits to New Mexico High School Libraries, 2000

Variable	Library Visits		
	Group library visits per 100 students	Group ISI visits per 100 students	Individual library visits per student
Library Staffing			
Librarian hours per 100 students		.307*	
Total staff per 100 students	.621**	.533**	.239*
Total staff hours per 100 students	.446**	.491**	.542**
Staff Activities (Percent of Weekly Hours)			
Attending faculty meetings	.276*		
Serving on standards/curriculum committees	.271*		
Information Technology			
Library computers per 100 students	.371**	.462**	.321**
Library Internet computers per 100 students	.340**	.407**	.319**
Library catalog computers per 100 students	.350**	.479**	
Information Resources			
Videos per 100 students	.508**	.462**	.330**
Software packages per 100 students		.364**	.417**
Library expenditures per 100 students	.353**	.319**	.431**

* $p < .05$, ** $p < .01$

Information Technology

Tenth grade test scores tend to rise with the availability of information technology in the library. School libraries that have more computers, especially ones that provide access to the library catalog and the Internet, tend to have:

- more library staff working more hours per week, and
- librarians who spend a greater share of their time meeting with their principals, providing in-service training to teachers, and providing reading incentive programs for students. (See Table 10.)

Table 10. Indirect School Library Predictors of Tenth Grade Achievement Scores via Information Technology in New Mexico High School Libraries, 2000

Variable	Information Technology		
	Library computers per 100 students	Library Internet computers per 100 students	Library catalog computers per 100 students
Library Staffing			
Total staff per 100 students	.559**	.484**	.397**
Total staff hours per 100 students	.702**	.660**	.467**
Staff Activities (Percent of Weekly Hours)			
Meeting with principal			.258*
Providing in-service training			.327**
Providing reading incentive programs	.265*	.252*	

* p < .05, ** p < .01

Print Volumes

Tenth grade achievement scores tend to improve with the size of a high school library's print collection. High schools that have larger print collections in their libraries tend to have:

- more weekly hours of librarian and total library staffing, and
- librarians who spend more weekly hours planning and teaching cooperatively with classroom teachers, meeting with other library staff, and attending faculty meetings. (See Table 11.)

Table 11. Indirect School Library Predictors of Tenth Grade Achievement Scores via Print Volumes Held by New Mexico High School Libraries, 2000

Variable	Print volumes
Library Staffing	
Weekly librarian hours	.266*
Total staff hours	.490**
Staff Activities (Weekly Hours)	
Planning with teachers	.296*
Teaching cooperatively	.584**
Meeting with other library staff	.302*
Attending faculty meetings	.252*

* p < .05, ** p < .01

Information Resources

Tenth grade achievement scores tend to increase with the size of video and software collections in high school libraries and overall library spending per student.

High school libraries with larger video and software collections and higher library spending tend to be those with:

- higher levels of staffing (especially larger total numbers of staff and total weekly staff hours), and
- librarians who spend more weekly hours providing reading incentive programs for students. (See Table 12.)

Additionally, larger software collections are found in high school libraries with:

- more librarian staff hours, and
- librarians who spend more weekly hours providing in-service training to classroom teachers.

Table 12. Indirect School Library Predictors of Tenth Grade Achievement Scores via Information Resources in New Mexico High School Libraries, 2000

	Information Resources		
Variable	**Videos per 100 students**	**Software packages per 100 students**	**Library expenditures per student**
Library Staffing			
Total librarian staff hours		.415**	
Total staff per 100 students	.529**	.476**	.492**
Total staff hours per 100 students	.608**	.594**	.597**
Staff Activities (Percent of Weekly Hours)			
Providing in-service training		.292*	
Providing reading incentive programs	.391**	.440**	.370**

* $p < .05$, ** $p < .01$

Controlling for Other School and Community Factors

To assert that the previously described relationships between school library characteristics and academic achievement are cause and effect, it is

essential to control for other school and community factors. Before such an analysis can be conducted, however, relationships among school library, other school, and community variables must be explored to eliminate redundant ones and to combine strongly related ones.

Correlation Analysis for School Library Development Variables

In the vast majority of recent school library impact studies, a critical factor has been the level of development of the school library—its staffing, its collections, and its funding. For this analysis, a somewhat more elaborate School Library Development Factor was developed. Of the many details collected about school library infrastructure in New Mexico elementary schools, positive and highly statistically significant relationships with each other were exhibited by six ratios: total staff hours per 100 students, volumes per student, subscriptions per 100 students, video materials per 100 students, software packages per 100 students, and school library expenditures per student. (See Table 13.)

An additional ratio, overall district expenditures per student, also correlated very strongly with volumes per student as well as subscriptions, video materials, and software packages per 100 students. Somewhat curiously, this overall expenditures ratio did not correlate excessively strongly with the school library expenditures ratio, despite the other very strong correlations just identified.

The need to include overall district expenditures per student in the School Library Development Factor is unusual, but reflects a reality worth recognizing. Strong school libraries cannot exert an impact on academic achievement in isolation. As this correlation indicates, a school library can only be effective if it is integrated fully into the daily operation of its school. District spending per pupil was not correlated so strongly with school library characteristics as to explain away the importance of the latter. These relationships were sufficiently strong, however, to indicate that higher levels of school funding and stronger school library programs combine to exert a positive influence on student performance. In other words, a school cannot strengthen its library at the expense of other programs and expect positive results.

Table 13. Correlation Matrix for School Library Development Variables and District Expenditures per Student for New Mexico High Schools, 2000

School Library Development Variable	*Librarian hours per 100 students*	Total staff hours per 100 students	Volumes per student	*Electronic references per 100 students*	Subscriptions per 100 students	*Audio materials per 100 students*	Video materials per 100 students	Software packages per 100 students	Library expenditures per student	District expenditures per student
Librarian hours per 100 students	1.00									
Total staff hours per 100 students		1.00								
Volumes per student		.590 **	1.00							
Electronic references per 100 students				1.00						
Subscriptions per 100 students		.607 **	.732 **	.326 **	1.00					
Audio materials per 100 students			.803 **		.540 **	1.00				
Video materials per 100 students		.608 **	.518 **		.502 **	.331 **	1.00			
Software packages per 100 students		.594 **	.510 **		.418 **	.288 *	.612 **	1.00		
Library expenditures per student		.597 **	.597 **	.300 *	.668 **	.327 **	.644 **	.844 **	1.00	
District expenditures per student			.613 **	.140	.640 **	.397 **	.619 **	.409 **	.530 **	1.00

* $p < .05$, ** $p < .01$
Italicized variable names are those for which either excessively strong relationships or an absence of relationships with other variables justified eliminating them.

Factor Analysis for School Library Development Variables

To achieve data reduction, other data items in the school library development category were discarded, and these six items were combined into a single School Library Development Factor based on the results of a factor analysis. All six of the items in question load highly on the resulting factor, which explains over 68 percent of the variation among the constituent statistics. These high factor loadings indicate that each of these statistics makes a substantial contribution to the composite variable—the School Library Development Factor—thereby achieving the goal of data reduction without substantial loss of information. (See Table 14.)

Table 14. Factor Analysis of School Library Development Variables for New Mexico High Schools, 2000

School Library Development Variable	Factor Loading
Total staff hours per 100 students	.809
Volumes per student	.796
Subscriptions per 100 students	.865
Videos per 100 students	.825
Software packages per 100 students	.759
Library expenditures per student	.885
District expenditures per student	.841

Initial eigenvalue = 4.784, percentage of variation explained = 68.336, principa.841l component analysis

Correlation Analysis for Other School and Community Variables

Previously reported bivariate correlations between school library characteristics and reading scores are insufficient alone to claim cause and effect relationships. A variety of school and community conditions might create antecedent conditions that would explain both school library characteristics and reading scores. For instance, it might be that rich schools or communities with well-educated adults have both high reading scores and strong school libraries. If that were the case, a strong school library could not be credited as even a partial cause of high reading scores. It would simply be another fortuitous consequence of favorable school or community conditions. (See Table 15.)

Before such relationships can be explored, however, relationships among school and community variables must be examined to ensure that there are no confounding relationships between any of them. Examining these relationships also sheds light on how they might be combined to achieve data reduction, thereby simplifying the model to be tested.

The correlation coefficients for school and community variables indicate that, indeed, they do fall into two groups. The three inter-related school variables are the percentage of teachers with master's degrees, teachers' average years of experience, and the teacher-pupil ratio. The three inter-related community variables are the percentages of poor and minority students and the percentage of adults in the community (including parents) who graduated from high school. Each trio of variables in these two groups is closely enough related to each other, both substantively and statistically, to

justify exploring via factor analysis the possibility of combining them into school and community factors.

Table 15. Correlation Matrix for School and Community Variables for New Mexico High Schools, 2000

School/ community variable	*Percent of teachers with master's degrees*	*Teachers' average years of experience*	*Teacher-pupil ratio*	**Percent of poor students**	**Percent of minority students**	**Percent of adults high school graduates**
Percent of teachers with master's degrees	*1.00*					
Teachers' average years of experience	*.577***	*1.00*				
Teacher-pupil ratio	*.381 ***	*.374***	*1.00*			
Percent of poor students	-.270*	-.278*		**1.00**		
Percent of minority students			.287*	**.569****	**1.00**	
Percent of adults high school graduates				**-651****		**1.00**

Italicized variables and correlation coefficients indicate related teacher variables.
Bold variables and correlation coefficients indicate related community variables.

Factor Analysis for Other School Variables

Not surprisingly, a factor analysis of the three school variables generated one strong factor that combines teachers' levels of education and experience and teacher-pupil ratios conducive to smaller class sizes. Thus, a single factor score can be utilized to summarize those three data elements. The resulting School Factor explains almost two-thirds of the variation in the constituent variables. (See Table 16.)

Table 16. Factor Analysis of Other School Variables for New Mexico High Schools, 2000

School Variable	Factor Loading
Percent of teachers with master's degrees	.838
Teachers' average years of experience	.835
Teacher-pupil ratio	.705

Initial eigenvalue = 1.897, percentage of variation explained = 63.220, principal component analysis

Factor Analysis of Community Socio-Economic Status (SES) Variables

Similarly, a factor analysis of the three community variables generated a single factor explaining more than two-thirds of the variation among communities in terms of poverty, race/ethnicity, and adult educational attainment. Notably, this Community Socio-Economic Status (SES) Factor is a negative one, as a community's score on it rises as the percentages of poor and minority students increase and the percentage of adult high school graduates decreases. (See Table 17.)

Table 17. Factor Analysis of Socio-Economic Status Variables for New Mexico High Schools, 2000

Community SES Variable	Factor Loading
Percent of poor students	.930
Percent of minority students	.729
Percent of adults high school graduates	-.779

Initial eigenvalue = 2.004, percentage of variation explained = 66.793, principal component analysis

Regression Analysis for School Library Development, School, and Community SES Factors

The preceding correlation and factor analyses generated a single factor score each representing School Library Development, School, and Community Socio-Economic Status (SES), setting the stage for a very simple, straightforward regression analysis. That statistical technique makes it possible to weigh the impact of School Library Development on achievement scores, while controlling for School and Community SES differences that might explain away any impact as something other than cause and effect. (See Table 18.)

Table 18. Regression Analysis of School Library Development, School, and Community SES Factors with Achievement Scores for New Mexico High Schools, 2000

Factor	R	R Square	R Square Change	Sig. F Change	Standardized Beta Coefficients	Sig. of t for Beta
Community SES	.648	.404	.420	.000	-.663	.000
School library development	.706	.471	.079	.025	.281	.023

School factor excluded.

For New Mexico high schools, the results indicate that the Community SES Factor exerts by far the stronger influence on academic achievement. The combined effects of poverty, racial/ethnic minority status, and low educational attainment explained a whopping 42.0 percent of the variation in students' reading scores. An additional 7.9 percent of such variation, however, is explained by the School Library Development Factor. After these two factors are taken into account, the remaining School Factor was excluded, as it explained no additional variation in student performance.

Such regression analysis results were not reproducible for elementary and middle schools, not because school librarians and libraries are unimportant at those levels, but because there was too little variation in librarian staffing levels from school to school. At the elementary level, an overwhelming 68 percent of participating schools did not have a full-time librarian; conversely, at the middle school level almost 65 percent reported precisely one full-time librarian—no more, no less. With the key variable, librarian staffing, simply not varying much from one school to another, it was not possible to isolate the impact of school libraries from other school or community conditions at these school levels.

Comparison of Highest & Lowest Scoring Schools

The foregoing analyses indicate that improvements in school library programs can help to change one of the state's lowest scoring schools on state achievement tests to one of the highest scoring schools. The following tables compare the 25 highest scoring schools with the 25 lowest scoring ones.

With only a few exceptions, schools with higher average test scores

- have demonstrably better developed school library programs—i.e., higher levels of staffing, collection development, and funding;
- have library staff who spend more time engaged in activities that contribute to collaborative teaching and learning; and
- have more extensive and sophisticated computer networks extending the reach of the school library. (See Tables 19 through 24.)

Table 19. Selected Library Media Statistics for New Mexico Elementary Schools Scoring Highest and Lowest on the Fourth Grade Achievement Test, 2000

Variable	Elementary school averages (4th grade)		
	25 highest scoring schools	25 lowest scoring schools	Percent difference (lowest to highest)
4th Grade Reading Scores (Percent proficient & above)	85.78	30.82	178%
Staffing (Weekly hours)			
LM Specialist hours	16.28	14.13	15%
per 100 students	4.27	3.78	13%
Total LM staff hours	38.03	41.51	(8%)
per 100 students	13.31	13.05	2%
Staff Activities (Weekly hours)			
Offering reading incentive activities	6.22	6.58	(5%)
Percent	17.77	14.85	20%
Meeting with library staff	0.57	0.51	12%
Percent	1.59	1.22	30%
Meeting w/standards, curriculum committees	0.54	0.44	23%
Percent	1.39	1.01	38%
Managing computers, network	4.90	3.93	25%
Percent	13.91	7.67	81%
Weekly LMC Usage			
Individual visits for information skills instruction	228.29	231.70	(1%)
per student	0.60	0.52	15%
Group visits for information skills instruction	15.65	15.43	1%
per 100 students	4.47	3.78	18%
Technology			
Number of LMC computers	4.24	4.47	(5%)
per 100 students	1.77	1.19	49%
Number of LMC computers with:			
- Internet connection	3.62	3.36	8%
per 100 students	1.15	0.85	35%
- Access to school library catalog	3.68	3.64	1%
per 100 students	1.07	0.86	24%
- Access to library databases	2.59	2.49	4%
per 100 students	0.83	0.63	32%
School computers not in LMC with access to LMC	39.25	34.08	15%
per 100 students	9.11	9.20	(1%)
School computers not in LMC w/access to LMC with:			
- Internet connection	37.59	24.24	55%
per 100 students	8.80	7.72	14%
- Access to school library catalog	21.49	10.72	100%
per 100 students	4.52	1.79	153%
- Access to library databases	20.07	6.22	223%
per 100 students	4.36	1.27	243%

Table 20 . Selected Library Media Statistics for New Mexico Elementary Schools Scoring Highest and Lowest on the Fourth Grade Achievement Test, 2000

Variable	Elementary school averages (4th grade)		
	25 highest scoring schools	25 lowest scoring schools	Percent difference (lowest to highest
4th Grade Reading Scores (Percent proficient & above)	85.78	30.82	178%
School Library Collection			
Number of print volumes	11,038.39	7,215.06	53%
per student	31.40	26.74	17%
Number of electronic reference titles	10.45	8.68	20%
per 100 students	3.00	1.11	170%
Current magazine & newspaper subscriptions	13.10	14.45	(9%)
per 100 students	4.88	4.83	1%
Audio materials - tapes, CDs, LPs	94.07	115.40	(18%)
per 100 students	33.21	28.16	18%
Video materials – tapes, disks	221.43	215.40	3%
per 100 students	62.35	57.24	9%
Computer software packages for in-school use	7.95	11.35	(30%)
per 100 students	4.68	3.36	39%

Table 21. Selected Library Media Statistics for New Mexico Middle Schools Scoring Highest and Lowest on the Eighth Grade Achievement Test, 2000

Variable	Middle school averages (8th grade)		
	25 highest scoring schools	25 lowest scoring schools	Percent difference (lowest to highest)
8th Grade Reading Scores (Percent proficient & above)	53.51	17.43	207%
Staffing (Weekly hours)			
LM Specialist hours	29.21	23.80	23%
per 100 students	6.44	6.62	(3%)
Staff Activities (Weekly hours)			
Planning with teachers	2.60	2.32	12%
Percent	5.65	5.23	8%
Teaching with teachers	11.25	9.57	18%
Percent	25.27	21.67	17%
Providing in-service training	1.75	1.23	42%
Percent	3.42	2.34	46%
Offering reading incentive activities	2.73	2.59	5%
Percent	5.79	6.19	(6%)
Doing collection development	2.99	2.74	9%
Percent	6.30	5.76	9%
Meeting with library staff	0.78	0.62	26%
Percent	1.51	1.57	(4%)
Meeting with principal, other administrators	0.56	0.68	(18%)
Percent	1.17	1.47	(20%)
Attending faculty or staff meetings	0.83	0.81	2%
Percent	1.75	1.87	(6%)
Meeting w/standards, curriculum committees, teams	0.53	0.51	4%
Percent	1.08	1.11	(3%)
Managing computers, network	6.36	6.79	(6%)
Percent	14.81	13.85	7%
Weekly LMC Usage			
Individual visits to LMC	356.14	330.53	8%
per student	0.82	1.43	(43%)
Group visits to LMC	15.76	13.95	13%
per 100 students	5.11	4.77	7%
Individual visits for information skills instruction	135.35	110.84	22%
per student	0.35	0.75	(53%)
Group visits for information skills instruction	10.00	8.26	21%
per 100 students	2.97	2.67	11%

Table 22. Selected Library Media Statistics for New Mexico Middle Schools Scoring Highest and Lowest on the Eighth Grade Achievement Test, 2000

Variable	Middle school averages (8th grade)		
	25 highest scoring schools	25 lowest scoring schools	Percent difference (lowest to highest)
8th Grade Reading Scores (Percent proficient & above)	53.51	17.43	207%
Technology			
Number of LMC computers	10.97	9.44	16%
per 100 students	3.19	2.78	15%
Number of LMC computers with:			
- Internet connection	9.74	8.68	12%
per 100 students	2.91	2.45	19%
- Access to school library catalog	7.46	5.05	48%
per 100 students	2.21	1.37	61%
- Access to library databases	7.29	4.11	77%
per 100 students	2.15	1.38	56%
School computers not in LMC w/access to LMC with:			
- Internet connection	64.36	63.94	1%
per 100 students	19.01	27.32	(30%)
- Access to school library catalog	23.06	16.84	37%
per 100 students	3.97	6.01	(34%)
- Access to library databases	44.84	20.06	124%
per 100 students	16.26	13.13	24%
School Library Collection			
Number of print volumes	10,864.24	8,193.75	33%
per student	33.97	26.57	28%
Number of electronic reference titles	12.13	10.20	19%
per 100 students	3.65	5.25	(30%)
Current magazine & newspaper subscriptions	23.89	23.19	3%
per 100 students	6.57	11.58	(43%)
Audio materials - tapes, CDs, LPs	85.94	81.83	5%
per 100 students	19.69	28.65	(31%)
Computer software packages for in-school use	16.70	11.83	41%
per 100 students	4.88	9.20	(47%)

Table 23. Selected Library Media Statistics for New Mexico High Schools Scoring Highest and Lowest on the Tenth Grade Achievement Test, 2000

Variable	High school averages (10th grade)		
	25 highest scoring schools	25 lowest scoring schools	Percent difference (lowest to highest)
10th Grade Reading Scores (Percent proficient & above)	91.32	71.73	27%
Staffing (Weekly hours)			
LM Specialist hours	29.80	31.93	(7%)
per 100 students	5.65	4.83	17%
Total LM staff hours	63.61	65.84	(3%)
per 100 students	19.71	14.57	35%
Staff Activities (Weekly hours)			
Planning with teachers	4.28	3.98	8%
Percent	6.43	6.00	6%
Teaching with teachers	14.59	12.22	19%
Percent	21.75	16.58	31%
Doing collection development	4.41	4.18	6%
Percent	7.28	5.93	23%
Meeting with library staff	1.28	1.08	19%
Percent	1.81	1.92	(6%)
Meeting with principal, other administrators	1.16	0.99	17%
Percent	2.01	1.61	25%
Attending faculty or staff meetings	0.80	0.59	36%
Percent	1.33	1.06	25%
Meeting w/standards, curriculum committees, teams	1.06	0.76	39%
Percent	1.88	1.37	37%
Weekly LMC Usage			
Individual visits to LMC	356.45	319.24	12%
per student	1.15	0.78	47%
Group visits to LMC	16.68	12.96	29%
per 100 students	3.64	2.18	67%
Individual visits for information skills instruction	157.13	157.81	0%
per student	0.36	0.21	71%
Group visits for information skills instruction	13.42	9.54	41%
per 100 students	2.98	1.62	84%

Table 24. Selected Library Media Statistics for New Mexico High Schools Scoring Highest and Lowest on the Tenth Grade Achievement Test, 2000

Variable	High school averages (10th grade) 25 highest scoring schools	25 lowest scoring schools	Percent difference (lowest to highest)
10th Grade Reading Scores (Percent proficient & above)	91.32	71.73	27%
Technology			
Number of LMC computers	13.26	11.68	14%
per 100 students	3.41	2.22	54%
Number of LMC computers with:			
- Internet connection	12.62	10.67	18%
per 100 students	3.27	1.92	70%
- Access to school library catalog	10.69	8.37	28%
per 100 students	2.21	1.25	77%
- Access to library databases	11.70	9.81	19%
per 100 students	2.87	1.64	75%
School computers not in LMC with access to LMC	75.50	77.48	(3%)
per 100 students	27.34	26.13	5%
School computers not in LMC w/access to LMC with:			
- Internet connection	78.27	76.39	2%
per 100 students	26.93	25.67	5%
- Access to school library catalog	44.67	36.67	22%
per 100 students	11.79	8.86	33%
- Access to library databases	70.83	64.54	10%
per 100 students	24.90	19.85	25%
School Library Collection			
Number of print volumes	14,502.57	12,380.88	17%
per student	31.43	31.06	1%
Number of electronic reference titles	17.70	38.89	(54%)
per 100 students	19.81	16.47	20%
Current magazine & newspaper subscriptions	37.82	36.88	3%
per 100 students	8.68	9.56	(9%)
Audio materials - tapes, CDs, LPs	117.50	67.04	75%
per 100 students	27.73	19.90	39%
Video materials – tapes, disks	437.22	475.39	(8%)
per 100 students	146.96	96.59	52%
Computer software packages for in-school use	16.18	11.22	44%
per 100 students	9.83	4.47	120%
Annual Operating Expenditures			
Total operating expenditures	$12,003.97	$11,362.57	6%
per student	$25.49	$22.08	15%

Conclusions

New Mexico achievement test scores rise with the development of school library programs. The relationship between school library development and test scores is not explained away by other school or community conditions at the high school level. There was insufficient variation in librarian staffing to make similar claims for the elementary and middle school levels.

School Library Development

New Mexico achievement test scores tend to rise with increases in:

- school librarian and total library staff hours per 100 students;
- print volumes per student;
- periodical subscriptions, video materials, and software packages per 100 students; and
- school library expenditures per student.

Whatever the current level of development of the school library program, these findings indicate that incremental improvements in its staffing, collections, and funding will yield incremental increases in achievement test scores. The only caveat is that school library spending cannot exert a positive influence on academic achievement if it comes at the expense of other school programs.

School & Community Differences

The impact of school library development on academic achievement at the high school level cannot be explained away by:

- school differences, including:
  - the percentage of classroom teachers with master's degrees,
  - teachers' average years of experience, and
  - the teacher/pupil ratio, or
- community differences, including:
  - the percentage of schoolchildren living in poverty,
  - the percentage of schoolchildren belonging to racial/ethnic minority groups, and
  - the percentage of adults who graduated from high school.

When these other conditions are taken into account, school library development alone accounts for 7.9 percent of variation in average achievement scores among high schools. This figure takes into account community socio-economic status (SES), which explains 42.0 percent of variation in high school test scores. It also considers other school conditions that explain no additional variation beyond the 50.0 percent attributable to the combination of community SES and school library development factors.

Similar conclusions could not be drawn from such analyses at elementary and middle school levels, due to a lack of variation in school library staffing at those school levels. (Most elementary schools lacked a full-time librarian; most middle schools had precisely one full-time librarian.)

School Librarians & Strong School Libraries

School librarians exert a complex web of effects on the school library programs. Findings about these effects are summed up in the following description of a strong school library.

A strong school library program is one

- that is adequately staffed, stocked and funded. Minimally, this means one full-time librarian and one full-time aide. The relationship, however, is incremental; as the staffing, collections, and funding of school library programs grow, achievement scores rise.

- whose staff are actively involved leaders in their school's teaching and learning enterprise. A successful school librarian is one who has the ear and support of the principal, serves with other teachers on the school's standards and curriculum committees, and holds regular meetings of the library staff. Students succeed where the school librarian participates with classroom teachers and administrators in making management decisions that encourage higher levels of achievement by every student.

- whose staff have collegial, collaborative relationships with classroom teachers. A successful school librarian is one who works with a classroom teacher to identify materials that best support and enrich an instructional unit, is a teacher of essential information literacy skills to students, and, indeed, is a provider of in-service training opportunities to classroom teachers. Students succeed where the school librarian is a consultant to, a colleague with, and a teacher of other teachers.

- that embraces networked information technology. The school library of today is no longer a destination; it is a point of departure for accessing the information resources that are the essential raw material of teaching and learning. Computers in classrooms, labs and other school locations provide networked access to information resources—the library catalog, electronic full text, licensed databases, locally mounted databases, and the Internet. Students succeed where the school library program is not a place to go, apart from other sites of learning in the school, but rather an integral part of the educational enterprise that reaches out to students and teachers where they are.

Recommendations for Action

The findings of this study recommend five specific actions by New Mexico school decision-makers:

- School libraries should have **funding for adequate professional and support staff, information resources, and information technology**. Such conditions are necessary if not sufficient alone to generate higher levels of academic achievement.

- The school library program cannot be limited to the library media center as a place. Just as school librarians must involve themselves in the design and delivery of instruction, **information technology** must be used to make information resources **available to teachers and students wherever they may be** in the school.

- While Internet access is important, the school librarian has an important role to play in ensuring that teachers and students have access to **high-quality licensed databases** from which current, authoritative information may be obtained. School librarians can provide **the necessary training** to ensure teachers and students know how to use the information tools and assess an information resource.

Appendices

Bibliography

Participating New Mexico Elementary Schools

Participating New Mexico Middle Schools

Participating New Mexico High Schools

Survey of New Mexico School Library Programs

The Impact of New Mexico School Libraries on Academic Achievement: Preliminary Results

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Participating New Mexico Elementary Schools

DISTRICT	SCHOOL
ALAMOGORDO	HEIGHTS ELEM
ALAMOGORDO	OREGON ELEMENTARY
ALAMOGORDO	SIERRA ELEM
ALBUQUERQUE	A. MONTOYA ELEM
ALBUQUERQUE	ADOBE ACRES ELEM
ALBUQUERQUE	ALAMOSA ELEM
ALBUQUERQUE	ALVARADO ELEM
ALBUQUERQUE	ARMIJO ELEM
ALBUQUERQUE	ARROYO DEL OSO ELEM
ALBUQUERQUE	ATRISCO ELEM
ALBUQUERQUE	BANDELIER ELEM
ALBUQUERQUE	BARCELONA ELEM
ALBUQUERQUE	BELLEHAVEN ELEM
ALBUQUERQUE	CARLOS REY ELEM
ALBUQUERQUE	CHAMIZA ELEM
ALBUQUERQUE	CHAPARRAL ELEM
ALBUQUERQUE	CHELWOOD ELEM
ALBUQUERQUE	COLLET PARK ELEM
ALBUQUERQUE	COMANCHE ELEM
ALBUQUERQUE	CORRALES ELEM
ALBUQUERQUE	DENNIS CHAVEZ ELEM
ALBUQUERQUE	DOLORES GONZALES ELE
ALBUQUERQUE	DOUBLE EAGLE ELEM
ALBUQUERQUE	EDMUND G ROSS ELEM
ALBUQUERQUE	EUGENE FIELD ELEM
ALBUQUERQUE	GEORGIA O'KEEFFE ELE
ALBUQUERQUE	HODGIN ELEM
ALBUQUERQUE	HUB H HUMPHREY ELEM
ALBUQUERQUE	KIRTLAND ELEM
ALBUQUERQUE	KIT CARSON ELEM
ALBUQUERQUE	LAVALAND ELEM
ALBUQUERQUE	LEW WALLACE ELEM
ALBUQUERQUE	LONGFELLOW ELEM
ALBUQUERQUE	LOS PADILLAS ELEM
ALBUQUERQUE	LOWELL ELEM
ALBUQUERQUE	MARIE M HUGHES ELEM
ALBUQUERQUE	MARK TWAIN ELEM
ALBUQUERQUE	MATHESON PARK ELEM
ALBUQUERQUE	MONTE VISTA ELEM
ALBUQUERQUE	MONTEZUMA ELEM
ALBUQUERQUE	MOUNTAIN VIEW ELEM
ALBUQUERQUE	NAVAJO ELEM

ALBUQUERQUE	ONATE ELEM
ALBUQUERQUE	OSUNA ELEM
ALBUQUERQUE	PAINTED SKY ELEM
ALBUQUERQUE	PAJARITO ELEM
ALBUQUERQUE	REGINALD CHAVEZ EL
ALBUQUERQUE	S. R. MARMON ELEM
ALBUQUERQUE	S. Y. JACKSON ELEM
ALBUQUERQUE	SAN ANTONITO ELEM
ALBUQUERQUE	SANDIA BASE ELEM
ALBUQUERQUE	SIERRA VISTA ELEM
ALBUQUERQUE	TOMASITA ELEM
ALBUQUERQUE	VALLE VISTA ELEM
ALBUQUERQUE	WHERRY ELEM
ALBUQUERQUE	ZIA ELEM
ALBUQUERQUE	ZUNI ELEM
ANIMAS	ANIMAS ELEMENTARY
ARTESIA	CENTRAL ELEMENTARY
ARTESIA	HERMOSA ELEMENTARY
ARTESIA	ROSELAWN ELEMENTARY
ARTESIA	YESO ELEMENTARY
ARTESIA	YUCCA ELEMENTARY
AZTEC	PARK AVENUE ELEM
BERNALILLO	ALGODONES ELEMENTARY
BERNALILLO	SANTO DOMINGO ELEM
BERNALILLO	W. D. CARROLL ELEM
BLOOMFIELD	BLANCO ELEMENTARY
BLOOMFIELD	NAABA ANI ELEM
CAPITAN	CAPITAN ELEMENTARY
CARLSBAD	CRAFT ELEMENTARY
CARLSBAD	EDDY ELEMENTARY
CARLSBAD	MONTERREY ELEMENTARY
CARLSBAD	PATE ELEMENTARY
CARLSBAD	RIVERSIDE ELEMENTARY
CARLSBAD	SUNSET ELEMENTARY
CENTRAL CONS.	EVA B. STOKELY ELEM
CENTRAL CONS.	MESA ELEMENTARY
CENTRAL CONS.	OJO AMARILLO ELEM
CHAMA	CHAMA ELEMENTARY
CHAMA	TIERRA AMARILLA ELEM
CLAYTON	ALVIS ELEMENTARY
CLOVIS	BARRY ELEMENTARY
CLOVIS	HIGHLAND ELEMENTARY
CLOVIS	JAMES BICKLEY ELEM
CLOVIS	LA CASITA ELEMENTARY
CLOVIS	LOCKWOOD ELEMENTARY
CLOVIS	MESA ELEMENTARY
CLOVIS	PARKVIEW ELEMENTARY

CLOVIS	RANCHVALE ELEMENTARY
COBRE CONS.	BAYARD ELEMENTARY
COBRE CONS.	HURLEY ELEMENTARY
COBRE CONS.	SAN LORENZO ELEM
CORONA	CORONA ELEMENTARY
DEMING	BELL ELEMENTARY
DEMING	COLUMBUS ELEMENTARY
DES MOINES	DES MOINES ELEM
DORA	DORA ELEMENTARY
DULCE	DULCE ELEMENTARY
ELIDA	ELIDA ELEMENTARY
ESPANOLA	ABIQUIU ELEMENTARY
ESPANOLA	ESPANOLA ELEMENTARY
ESPANOLA	FAIRVIEW ELEMENTARY
ESPANOLA	HERNANDEZ ELEMENTARY
FARMINGTON	APACHE ELEMENTARY
FARMINGTON	COUNTRY CLUB ELEM
FARMINGTON	ESPERANZA ELEMENTARY
FARMINGTON	MC CORMICK ELEM
FARMINGTON	MC KINLEY ELEMENTARY
FARMINGTON	SWINBURNE ELEMENTARY
FLOYD	FLOYD ELEMENTARY
GADSDEN	BERINO ELEMENTARY
GADSDEN	DESERT TRAILS INT
GADSDEN	LA UNION ELEMENTARY
GADSDEN	LOMA LINDA ELEM
GALLUP	CROWNPOINT ELEM
GALLUP	DAVID SKEET ELEM
GALLUP	INDIAN HILLS ELEM
GALLUP	JEFFERSON ELEMENTARY
GALLUP	LINCOLN ELEM
GALLUP	ROOSEVELT ELEM
GALLUP	SMITH LAKE ELEM
GALLUP	STAGECOACH ELEM
GALLUP	THOREAU ELEMENTARY
GALLUP	WASHINGTON ELEM
GRANTS	MOUNT TAYLOR ELEM
GRANTS	SAN RAFAEL ELEM
HAGERMAN	HAGERMAN ELEMENTARY
HATCH	GARFIELD ELEMENTARY
HOBBS	BROADMOOR ELEMENTARY
HOBBS	COLLEGE LANE ELEM
HOBBS	CORONADO ELEMENTARY
HOBBS	JEFFERSON ELEMENTARY
HOBBS	SANGER ELEMENTARY
HOBBS	TAYLOR ELEMENTARY
HOBBS	WILL ROGERS ELEM

HONDO	HONDO ELEMENTARY
HOUSE	HOUSE ELEMENTARY
JAL	JAL ELEMENTARY
LAS CRUCES	ALAMEDA ELEMENTARY
LAS CRUCES	BOOKER T. WASHINGTON
LAS CRUCES	CENTRAL ELEMENTARY
LAS CRUCES	CONLEE ELEMENTARY
LAS CRUCES	DESERT HILLS ELEM
LAS CRUCES	DONA ANA ELEMENTARY
LAS CRUCES	EAST PICACHO ELEM
LAS CRUCES	HIGHLAND ELEMENTARY
LAS CRUCES	HILLRISE ELEMENTARY
LAS CRUCES	JORNADA ELEMENTARY
LAS CRUCES	LOMA HEIGHTS ELEM
LAS CRUCES	MAC ARTHUR ELEM
LAS CRUCES	MESILLA ELEMENTARY
LAS CRUCES	MESILLA PARK ELEM
LAS CRUCES	SUNRISE ELEMENTARY
LAS CRUCES	TOMBAUGH ELEM
LAS CRUCES	UNIVERSITY HILLS ELE
LAS CRUCES	VALLEY VIEW ELEM
LAS VEGAS EAST	LEGION PARK ELEM
LAS VEGAS EAST	LOS NINOS ELEMENTARY
LAS VEGAS EAST	PAUL D. HENRY ELEM
LAS VEGAS EAST	SIERRA VISTA ELEM
LOS ALAMOS	ASPEN ELEMENTARY
LOS ALAMOS	BARRANCA MESA ELEM
LOS ALAMOS	CHAMISA ELEMENTARY
LOS ALAMOS	MOUNTAIN ELEMENTARY
LOS ALAMOS	PINON ELEMENTARY
LOS LUNAS	TOME ELEMENTARY
LOS LUNAS	VALENCIA ELEMENTARY
LOVING	LOVING ELEMENTARY
MAXWELL	MAXWELL ELEMENTARY
MELROSE	MELROSE ELEMENTARY
MORA	MORA ELEMENTARY
MORIARTY	EDGEWOOD ELEMENTARY
MORIARTY	MORIARTY ELEMENTARY
MORIARTY	MOUNTAINVIEW ELEM
MORIARTY	ROUTE 66 ELEMENTARY
MORIARTY	SOUTH MOUNTAIN ELEM
MOUNTAINAIR	MOUNTAINAIR ELEM
PENASCO	PENASCO ELEMENTARY
QUESTA	RED RIVER ELEMENTARY
QUESTA	RIO COSTILLA ELEM
RATON	KEARNEY ELEMENTARY
RESERVE	GLENWOOD ELEMENTARY

RIO RANCHO	COLINAS DEL NORTE EL
RIO RANCHO	ENCHANTED HILLS ELEM
RIO RANCHO	ERNEST STAPLETON ELE
RIO RANCHO	MARTIN KING JR ELEM
RIO RANCHO	RIO RANCHO ELEM
ROSWELL	BERRENDO ELEMENTARY
ROSWELL	E GRAND PLAINS ELEM
ROSWELL	MILITARY HGTS ELEM
SAN JON	SAN JON ELEMENTARY
SANTA FE	AGUA FRIA ELEMENTARY
SANTA FE	ALVORD ELEMENTARY
SANTA FE	ATALAYA ELEMENTARY
SANTA FE	EL DORADO ELEMENTARY
SANTA FE	FRANCIS X. NAVA ELEM
SANTA FE	LARRAGOITE ELEM
SANTA FE	WOOD-GORMLEY ELEM
SANTA ROSA	SANTA ROSA ELEM
SILVER CITY	HARRISON SCHMITT ELE
SILVER CITY	SIXTH STREET ELEM
TAOS	ARROYO DEL NORTE ELE
TAOS	ENOS GARCIA ELEM
TATUM	TATUM ELEMENTARY
TUCUMCARI	MOUNTAIN VIEW ELEM
TULAROSA	TULAROSA ELEMENTARY
VAUGHN	VAUGHN ELEMENTARY

Participating New Mexico Middle Schools

DISTRICT	SCHOOL
ALAMOGORDO	CHAPARRAL MIDDLE
ALAMOGORDO	MT VIEW MIDDLE SCH.
ALBUQUERQUE	DESERT RIDGE MIDDLE
ALBUQUERQUE	EISENHOWER MIDDLE
ALBUQUERQUE	ERNIE PYLE MIDDLE
ALBUQUERQUE	GARFIELD MIDDLE
ALBUQUERQUE	HARRISON MIDDLE
ALBUQUERQUE	HAYES MIDDLE
ALBUQUERQUE	JACKSON MIDDLE
ALBUQUERQUE	JEFFERSON MIDDLE
ALBUQUERQUE	L.B. JOHNSON MIDDLE
ALBUQUERQUE	MADISON MIDDLE
ALBUQUERQUE	MC KINLEY MIDDLE
ALBUQUERQUE	TAFT MIDDLE
ALBUQUERQUE	TAYLOR MIDDLE
ALBUQUERQUE	TRUMAN MIDDLE
ALBUQUERQUE	WASHINGTON MIDDLE
ALBUQUERQUE	WILSON MIDDLE
ANIMAS	ANIMAS MIDDLE
AZTEC	CV KOOGLER MIDDLE
BELEN	BELEN MIDDLE
BERNALILLO	SANTO DOMINGO MIDDLE
BLOOMFIELD	MESA ALTA JR HIGH
CAPITAN	CAPITAN MIDDLE
CARLSBAD	ALTA VISTA MIDDLE
CARLSBAD	P.R. LEYVA MIDDLE
CARRIZOZO	CARRIZOZO MIDDLE
CENTRAL CONS.	KIRTLAND MIDDLE
CENTRAL CONS.	NEWCOMB MIDDLE
CHAMA	CHAMA MIDDLE
CHAMA	TIERRA AMARILLA MID
CLOVIS	MARSHALL JR HIGH
CLOVIS	W.D. GATTIS JR HIGH
CLOVIS	YUCCA JR HIGH
COBRE CONS.	SNELL MIDDLE
CORONA	CORONA HIGH
CUBA	CUBA MIDDLE
DES MOINES	DES MOINES HIGH
DEXTER	DEXTER MIDDLE
DORA	DORA HIGH
DULCE	DULCE MIDDLE
ELIDA	ELIDA HIGH

ESPANOLA	ESPANOLA MIDDLE
FARMINGTON	HEIGHTS JR HIGH
FARMINGTON	MESA VIEW JR HIGH
FARMINGTON	TIBBETTS JR HIGH
FLOYD	FLOYD MIDDLE
GADSDEN	CHAPARRAL MIDDLE
GADSDEN	GADSDEN MIDDLE
GADSDEN	SANTA TERESA MIDDLE
GALLUP	CROWNPOINT HIGH
GALLUP	GALLUP JUNIOR HIGH
GALLUP	NAVAJO PINE HIGH
GALLUP	RAMAH HIGH
GALLUP	THOREAU MIDDLE
GRANTS	LAGUNA-ACOMA MIDDLE
HAGERMAN	HAGERMAN MIDDLE
HATCH	HATCH VALLEY MIDDLE
HOBBS	HEIZER JR HIGH
HOBBS	HIGHLAND JR HIGH
HOBBS	HOUSTON JR HIGH
HONDO	HONDO HIGH
HOUSE	HOUSE HIGH
LAS CRUCES	CAMINO REAL MIDDLE
LAS CRUCES	LYNN MIDDLE
LAS CRUCES	PICACHO MIDDLE
LAS CRUCES	SIERRA MIDDLE
LAS CRUCES	VISTA MIDDLE
LAS CRUCES	WHITE SANDS MIDDLE
LAS CRUCES	ZIA MIDDLE
LAS VEGAS EAST	MEMORIAL MIDDLE
LOS ALAMOS	LOS ALAMOS MIDDLE
LOS LUNAS	LOS LUNAS MIDDLE
LOS LUNAS	MANZANO VISTA MIDDLE
LOVING	LOVING MIDDLE
MAGDALENA	MAGDALENA MIDDLE
MAXWELL	MAXWELL MIDDLE
MELROSE	MELROSE HIGH
MORA	MORA MIDDLE
MOUNTAINAIR	MOUNTAINAIR HIGH
POJOAQUE	POJOAQUE MIDDLE
PORTALES	PORTALES JR HIGH
RATON	RATON MIDDLE
RIO RANCHO	LINCOLN MIDDLE
RIO RANCHO	MOUNTAIN VIEW MIDDLE
ROSWELL	BERRENDO MIDDLE
ROSWELL	SIERRA MIDDLE
RUIDOSO	RUIDOSO MIDDLE
SAN JON	SAN JON HIGH

SANTA FE	ALAMEDA MIDDLE
SANTA FE	CALVIN CAPHAW JR
SANTA FE	DE VARGAS JR HIGH
SILVER CITY	LA PLATA MIDDLE
SPRINGER	SPRINGER HIGH
TAOS	TAOS MIDDLE
TATUM	TATUM JR HIGH
TEXICO	TEXICO MIDDLE
TRUTH OR CONS.	T OR C MIDDLE
VAUGHN	VAUGHN HIGH
ZUNI	ZUNI MIDDLE
ESPANOLA	ABIQUIU ELEMENTARY
ESPANOLA	ESPANOLA ELEMENTARY
ESPANOLA	FAIRVIEW ELEMENTARY
ESPANOLA	HERNANDEZ ELEMENTARY
FARMINGTON	APACHE ELEMENTARY
FARMINGTON	COUNTRY CLUB ELEM
FARMINGTON	ESPERANZA ELEMENTARY
FARMINGTON	MC CORMICK ELEM
FARMINGTON	MC KINLEY ELEMENTARY
FARMINGTON	SWINBURNE ELEMENTARY
FLOYD	FLOYD ELEMENTARY
GADSDEN	BERINO ELEMENTARY
GADSDEN	DESERT TRAILS INT
GADSDEN	LA UNION ELEMENTARY
GADSDEN	LOMA LINDA ELEM
GALLUP	CROWNPOINT ELEM
GALLUP	DAVID SKEET ELEM
GALLUP	INDIAN HILLS ELEM
GALLUP	JEFFERSON ELEMENTARY
GALLUP	LINCOLN ELEM
GALLUP	ROOSEVELT ELEM
GALLUP	SMITH LAKE ELEM
GALLUP	STAGECOACH ELEM
GALLUP	THOREAU ELEMENTARY
GALLUP	WASHINGTON ELEM
GRANTS	MOUNT TAYLOR ELEM
GRANTS	SAN RAFAEL ELEM
HAGERMAN	HAGERMAN ELEMENTARY
HATCH	GARFIELD ELEMENTARY
HOBBS	BROADMOOR ELEMENTARY
HOBBS	COLLEGE LANE ELEM
HOBBS	CORONADO ELEMENTARY
HOBBS	JEFFERSON ELEMENTARY
HOBBS	SANGER ELEMENTARY
HOBBS	TAYLOR ELEMENTARY
HOBBS	WILL ROGERS ELEM

HONDO	HONDO ELEMENTARY
HOUSE	HOUSE ELEMENTARY
JAL	JAL ELEMENTARY
LAS CRUCES	ALAMEDA ELEMENTARY
LAS CRUCES	BOOKER T. WASHINGTON
LAS CRUCES	CENTRAL ELEMENTARY
LAS CRUCES	CONLEE ELEMENTARY
LAS CRUCES	DESERT HILLS ELEM
LAS CRUCES	DONA ANA ELEMENTARY
LAS CRUCES	EAST PICACHO ELEM
LAS CRUCES	HIGHLAND ELEMENTARY
LAS CRUCES	HILLRISE ELEMENTARY
LAS CRUCES	JORNADA ELEMENTARY
LAS CRUCES	LOMA HEIGHTS ELEM
LAS CRUCES	MAC ARTHUR ELEM
LAS CRUCES	MESILLA ELEMENTARY
LAS CRUCES	MESILLA PARK ELEM
LAS CRUCES	SUNRISE ELEMENTARY
LAS CRUCES	TOMBAUGH ELEM
LAS CRUCES	UNIVERSITY HILLS ELE
LAS CRUCES	VALLEY VIEW ELEM
LAS VEGAS EAST	LEGION PARK ELEM
LAS VEGAS EAST	LOS NINOS ELEMENTARY
LAS VEGAS EAST	PAUL D. HENRY ELEM
LAS VEGAS EAST	SIERRA VISTA ELEM
LOS ALAMOS	ASPEN ELEMENTARY
LOS ALAMOS	BARRANCA MESA ELEM
LOS ALAMOS	CHAMISA ELEMENTARY
LOS ALAMOS	MOUNTAIN ELEMENTARY
LOS ALAMOS	PINON ELEMENTARY
LOS LUNAS	TOME ELEMENTARY
LOS LUNAS	VALENCIA ELEMENTARY
LOVING	LOVING ELEMENTARY
MAXWELL	MAXWELL ELEMENTARY
MELROSE	MELROSE ELEMENTARY
MORA	MORA ELEMENTARY
MORIARTY	EDGEWOOD ELEMENTARY
MORIARTY	MORIARTY ELEMENTARY
MORIARTY	MOUNTAINVIEW ELEM
MORIARTY	ROUTE 66 ELEMENTARY
MORIARTY	SOUTH MOUNTAIN ELEM
MOUNTAINAIR	MOUNTAINAIR ELEM
PENASCO	PENASCO ELEMENTARY
QUESTA	RED RIVER ELEMENTARY
QUESTA	RIO COSTILLA ELEM
RATON	KEARNEY ELEMENTARY
RESERVE	GLENWOOD ELEMENTARY

RIO RANCHO	COLINAS DEL NORTE EL
RIO RANCHO	ENCHANTED HILLS ELEM
RIO RANCHO	ERNEST STAPLETON ELE
RIO RANCHO	MARTIN KING JR ELEM
RIO RANCHO	RIO RANCHO ELEM
ROSWELL	BERRENDO ELEMENTARY
ROSWELL	E GRAND PLAINS ELEM
ROSWELL	MILITARY HGTS ELEM
SAN JON	SAN JON ELEMENTARY
SANTA FE	AGUA FRIA ELEMENTARY
SANTA FE	ALVORD ELEMENTARY
SANTA FE	ATALAYA ELEMENTARY
SANTA FE	EL DORADO ELEMENTARY
SANTA FE	FRANCIS X. NAVA ELEM
SANTA FE	LARRAGOITE ELEM
SANTA FE	WOOD-GORMLEY ELEM
SANTA ROSA	SANTA ROSA ELEM
SILVER CITY	HARRISON SCHMITT ELE
SILVER CITY	SIXTH STREET ELEM
TAOS	ARROYO DEL NORTE ELE
TAOS	ENOS GARCIA ELEM
TATUM	TATUM ELEMENTARY
TUCUMCARI	MOUNTAIN VIEW ELEM
TULAROSA	TULAROSA ELEMENTARY
VAUGHN	VAUGHN ELEMENTARY

Participating New Mexico High Schools

DISTRICT	SCHOOL
ALAMOGORDO	ALAMOGORDO HIGH
ALBUQUERQUE	ALBUQUERQUE HIGH
ALBUQUERQUE	ELDORADO HIGH
ALBUQUERQUE	HIGHLAND HIGH
ALBUQUERQUE	MANZANO HIGH
ALBUQUERQUE	RIO GRANDE HIGH
ALBUQUERQUE	WEST MESA HIGH
ANIMAS	ANIMAS HIGH
ARTESIA	ARTESIA HIGH
BLOOMFIELD	BLOOMFIELD HIGH
CAPITAN	CAPITAN HIGH
CARLSBAD	CARLSBAD HIGH
CARRIZOZO	CARRIZOZO HIGH
CENTRAL CONS.	SHIPROCK HIGH
CHAMA	ESCALANTE HIGH
CLAYTON	CLAYTON HIGH
CLOVIS	CLOVIS HIGH
CORONA	CORONA HIGH
CUBA	CUBA HIGH
DES MOINES	DES MOINES HIGH
DORA	DORA HIGH
ELIDA	ELIDA HIGH
ESPANOLA	ESPANOLA VALLEY HIGH
FARMINGTON	FARMINGTON HIGH
FARMINGTON	PIEDRA VISTA HIGH
FLOYD	FLOYD HIGH
GADSDEN	GADSDEN HIGH
GADSDEN	SANTA TERESA HIGH
GALLUP	CROWNPOINT HIGH
GALLUP	GALLUP CENTRAL HIGH
GALLUP	GALLUP HIGH
GALLUP	NAVAJO PINE HIGH
GALLUP	RAMAH HIGH
GALLUP	THOREAU HIGH
GALLUP	TOHATCHI HIGH
GRANTS	LAGUNA-ACOMA HIGH
HAGERMAN	HAGERMAN HIGH
HATCH	HATCH VALLEY HIGH
HOBBS	HOBBS HIGH
HONDO	HONDO HIGH
HOUSE	HOUSE HIGH
JEMEZ VALLEY	JEMEZ VALLEY HIGH

LAS CRUCES	LAS CRUCES HIGH
LAS CRUCES	MAYFIELD HIGH
LAS CRUCES	ONATE HIGH
LOS ALAMOS	LOS ALAMOS HIGH
LOS LUNAS	LOS LUNAS HIGH
LOVINGTON	LOVINGTON HIGH
MAGDALENA	MAGDALENA HIGH
MAXWELL	MAXWELL HIGH
MELROSE	MELROSE HIGH
MORA	MORA HIGH
MOUNTAINAIR	MOUNTAINAIR HIGH
PENASCO	PENASCO HIGH
PORTALES	PORTALES HIGH
RATON	RATON HIGH
ROSWELL	GODDARD HIGH
ROSWELL	ROSWELL HIGH
RUIDOSO	RUIDOSO HIGH
SAN JON	SAN JON HIGH
SANTA FE	CAPITAL HIGH
SANTA FE	SANTA FE HIGH
SANTA ROSA	SANTA ROSA HIGH
SOCORRO	SOCORRO HIGH
SPRINGER	SPRINGER HIGH
TAOS	TAOS HIGH
TATUM	TATUM HIGH
TEXICO	TEXICO HIGH
TRUTH OR CONS.	HOT SPRINGS HIGH
TUCUMCARI	TUCUMCARI HIGH
VAUGHN	VAUGHN HIGH
ZUNI	ZUNI HIGH

Survey of New Mexico School Library Programs

DUE DATE October 6, 2000

Direct questions to:
Keith Lance
e-mail: klance@sni.net - Voice mail: 303/466-1860
(replies to questions within 48 hours)

GENERAL INSTRUCTIONS:

ALL grayed areas require responses. Even if you must use "?," "0," "none," or a good estimate, please enter your best response in **ALL** grayed areas.
Return the completed questionnaire in the enclosed postage-paid envelope, or if you prefer, address your own envelope to: **Marcia J. Rodney**
527 W. Ash Court
Louisville, CO 80027

This questionnaire may be downloaded from
http://www.stlib.state.nm.us/survey/sur.html

PART A - INFORMATION ON YOU AND YOUR SCHOOL

Identify your school by name, level, and district. Provide Name and Title for the individual who responded to this survey. Complete a separate questionnaire for each school. Do not combine data for multiple schools.

School Name				
School Level (Mark one)	❑ Elementary	❑ Jr High/Middle	❑ High	❑ Combined
Tested Grades in School (check all that apply):	5	8	10	
District Name				
School Address				
City	County		Zip code	
Name of Respondent		Title		
Phone ( )	Fax ( )	E-mail:		

PART B - SERVICE HOURS PER TYPICAL WEEK

Report the typical **weekly** number of hours your school library is open for use. Report hours you are open for use during school hours, before and after school hours, and during the summer.

Item	*Line*	*Hours per Typical* ***Week***
Hours open per typical school **week** during student use time	1	
Hours closed per typical school **week** during student use time	2	
Hours open per typical school **week** after 4:00 p.m.	3	
Hours open per typical summer **week** during student use time	4	

PART C - SCHOOL LIBRARY STAFFING PER TYPICAL WEEK

Report the number of **persons** (*not* FTEs) in each type of position specified (Lines 1 and 2, Col. A), and the total number of person-hours paid per typical **week** for each staff type (Lines 1 and 2, Col. B). That is, enter the **sum** of typical weekly hours for all of your staff of each type. Do not report more than 40 hours per week for any one person. Report each *individual* only once in Col. A.

Example: *If "2" persons are reported as "All other paid staff" on Line 2, Col. A, and one works 20 hours per week and the other works 10 hours per week, enter "30" on Line 2, Col. B.*

Paid Staff	*Line*	**Col. A** *Number of Persons (head count, **not** FTE)*	**Col. B** *Total Person-Hours per Typical **Week***
School librarians with teacher license & library endorsement	1		
All other paid staff	2		
TOTALS (Add Lines 1 + 2. See Note, Line D18 below)	**3**		

PART D – ACTIVITIES OF PAID STAFF PER TYPICAL WEEK

Your staff no doubt engages in a wide variety of activities. For each of the following key activities, report the number of hours per typical **week** your staff spend on each activity. Estimate if necessary. The optional column for non-contract hours refers to hours worked beyond the regular day.

Selected Activities	*Person-hours per typical **week*** *Line*	*Contract hours (a)*	*OPTIONAL Non-Contract Hours (b)*
Collaboration Hours spent weekly identifying materials for and planning instructional units with teachers	1		
Hours spent weekly teaching students cooperatively with teachers or providing information skills instruction to students—individually or in groups (e.g., locating information, citations, copyright/plagiarism, evaluating Internet sources, note-taking)	2		
Hours spent weekly providing in-service training to teachers and/or other school staff (includes informal one to one and formal group sessions)	3		
Hours spent weekly offering reading incentive activities for students (e.g., reader's advisory services, book talks, story times, author visits, puppet shows)	4		
Hours spent weekly on collection development (e.g., selecting materials)	5		
Leadership Hours spent weekly meeting with school library staff from building, district, or beyond	6		
Hours spent weekly meeting with principal and/or other building or district administrators	7		
Hours spent weekly attending general faculty and/or staff meetings	8		
Hours spent weekly with meeting standards and/or curriculum committees/teams/task forces	9		
Technology Hours spent weekly managing computers/library automation/computer network	10		
Other Hours spent weekly on **All other library activities** (e.g., processing, retrieving, checking in and out, re-shelving/re-storing) *plus* **Extra duties unrelated to school library services** (e.g., monitoring restrooms, lunch, etc.)	11		

TOTAL WEEKLY HOURS OF PAID STAFF (Add Lines 1 through 11.) ***Note:*** *The Total in D12A* ***MUST*** *equal the Total shown in Line 3, Col. B of Part C above.*	**12**		

PART E - SCHOOL LIBRARY USAGE PER TYPICAL WEEK

Report the following types of usage of your school library program **per typical week**. If you must estimate these figures and it is easier to estimate them for a month or year, estimate for a month and divide by four; or for a year, divide by the number of weeks the school library is open annually.

Type of Usage ***per Typical Week***	**Line**	*Number*
Total Visits to the school library (scheduled or unscheduled) by:		
■ **Individuals** (students, teachers, administrators, parents, student aides, volunteers, others)	1a	_____ people
■ **Classes** or other **groups** (e.g., the number of **groups** of teachers, administrators, parents, or classes touring your library)	1b	_____ groups
Information skills instruction contacts scheduled or unscheduled, (e.g., locating information, citations, copyright/plagiarism, critical thinking, evaluating Internet sources, note-taking) to: ■ **Individuals** (students, teachers, administrators, parents, others)	2a	_____ people
■ **Classes** or other **groups** (e.g., the number of **groups** of teachers, administrators, parents, or classes touring your library)	2b	_____ groups

PART F – COMPUTERS WITH ACCESS TO LIBRARY RESOURCES

1. In TOTAL, Line 1: Report the number of computers that can access your networked library resources. Separate the TOTAL into those that (Col. A) are *in* or *under supervision of* your library, and those that (Col. B) are located elsewhere in the school. Report each computer only once on Line 1. Do *not* include on Line 1 or anywhere in Col. B any computer that *cannot* access your networked resources.
2. On Lines 2 through 4, just report what each Line asks for, separated, as in Line 1, into Cols. A and B.
3. On Lines 2 through 4, any computer may be reported on more than one of Lines 2 through 5. For example, if it has both Internet and database access, it should be reported on both Lines 2 and 4.
4. Line 1 normally will *not* be the sum of Lines 2 through 5, and is not intended to be.
5. Consider the terms "computer", "terminal", and "workstation" to be synonymous.

Number of computers	*Line*	*Number of computers from which any networked library resources may be accessed*	
		Col. A *Located in or under supervision of library*	**Col. B** *Located elsewhere in the school*
TOTAL: Enter the *TOTAL* number of computers in each category: →	**1**		
Number of each TOTAL on Line 1 ... ■ With Internet connection	2		
■ With access to the school library catalog	3		
■ With access to school library databases (e.g., ProQuest, SIRS)	4		

PART G - SCHOOL LIBRARY COLLECTION

Report all materials available for use by teachers and/or students. **Include** circulating and non-circulating items. **Exclude** uncataloged materials reserved exclusively for use by school library staff or building administrators (e.g., principal, counselor, secretary).

Also report average copyright years. If you can't get copyright years from an electronic catalog, pull a systematic random selection of 25 items in the category (e.g., one per range or section, every third item, an item from every fifth shelf) and average their copyright years.

Item	Line	Number	Average Copyright Year
Books, all types (number of all volumes) *report average copyright year for reference only*	1		(reference)
Encyclopedias & reference titles on CD-ROM or laser disk	2		
Current print subscriptions to magazines & newspapers	3		**N/A**
Audio materials (cassettes, CDs, LPs)	4		
Video materials (cassettes and disks)	5		
Computer software packages (for use in school library by students)	6		
Does the school library subscribe to ■ Any online or CD-ROM services (e.g., ProQuest, InfoTrac, UMI, SIRS, Newsbank)?	7	❑ YES	❑ NO

PART H - ANNUAL OPERATING EXPENDITURES

Report the annual operating expenditures for your school library program from the school budget. For example, print materials, materials in electronic format, audio, video, and microform are typically part of annual operating expenditures. Electronic access to information such as licensed databases or Internet access might be part of your budget.

Salaries are not part of these expenditures, since they typically come from a different budget. Exclude major one-time capital outlays for computers, furniture, and other equipment.

Item	*Line*	*Whole dollars only*
TOTAL OPERATING EXPENDITURES	1	**.00**

New Mexico State Library

How School Libraries Improve Outcomes for Children

The New Mexico Study

Preliminary results are in on the New Mexico study of the impact of school libraries on academic achievement.

Elementary Level

Fourth grade reading scores tend to rise with

- the total number of library staff;
- library staff time spent managing networked computers;
- the number of computers throughout the school providing access to the library catalog, licensed databases, and the Internet; and
- the number of print volumes in the school library collection, and
- the number of electronic reference sources relative to the school's enrollment.

Middle School Level

Eighth grade reading scores tend to increase with

- the school library's weekly hours of operation;
- extra time spent by library staff on planning with and providing in-service training to teachers, providing reading incentive programs to students, developing library collections, and managing networked computers that provide access to online information resources;
- the number of print volumes in the school library collection; and
- the number of library computers providing access to licensed databases.

High School Level

Tenth grade reading scores tend to improve with

- the total weekly hours of library staffing (including professional and support staff) relative to enrollment;
- the percentage of library staff time spent teaching cooperatively with classroom teachers;
- group visits to the school library, especially for information skills instruction, relative to enrollment as well as individual visits per student;
- the number of library computers relative to enrollment that provide access to the library catalog and the Internet; and
- the size of the library's print collection, the size of its video and software collections relative to enrollment, and library expenditures per student.

Relative Impact of School Library Development, Community Socio-Economic Status & Professional Teacher Status

At the high school level, where desirable library conditions were sufficiently prevalent to analyze, it was determined that the level of development of the school library (i.e., its staffing, its collections, and library as well as school funding) explains eight percent of the variation in reading scores. Two other factors were taken into account when assessing the impact of the school library: the socio-economic status of the community and the professional status of teachers in the school.

Not surprisingly, the socio-economic status of the community outweighed the impact of the school library, explaining a substantial 42 percent of test score variation. Unexpectedly, however, when this factor and the school library were taken into account, the status of the school's teachers (i.e., their education and experience, the teacher-pupil ratio) explained no additional variation.

Additional Information

The project report, How School Libraries Improve Outcomes for Children, reports in detail on school library conditions that exert both direct and indirect effects on student performance.

For a instructions on how to obtain a copy of the report, consult the New Mexico State Library website at http://www.stlib.state.nm.us.