Measuring Up to Standards

The Impact of School Library Programs & Information Literacy in Pennsylvania Schools

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Pennsylvania Citizens for Better Libraries

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The review of the literature contained herein updates the comprehensive review done for the original Colorado study. Indeed, it was produced by the same individual, Christine Hamilton-Pennell. In addition to updating her earlier effort, 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 school library development.

Finally, for sidebar stories illustrating key findings of the study, we are indebted to John Emerick and school library information programs participating in the POWER Library project.

Keith Curry Lance
Denver, Colorado

Executive Summary

Pennsylvania school library programs can make a difference supporting the efforts of schools to measure up to standards. Pennsylvania System of School Assessment (PSSA) reading scores increase with increases in the following characteristics of school library programs: staffing, information technology, and integration of information literacy into the curriculum. In addition, as library staffing, information resources and information technology rise, so too does the involvement of school librarians in teaching students and teachers how to find and assess information. The relationship between staffing and test scores is not explained away by other school or community conditions. (See Figure 1, p. 9.)

Staffing

PSSA reading test scores increase with increases in:

- school librarian staff hours; and
- support staff hours.

Information Technology

Where networked computers link school libraries with classrooms, labs and other instructional sites, students earn higher PSSA reading test scores. These higher scores are particularly linked to the numbers of computers enabling teachers and students to utilize:

- the ACCESS PENNSYLVANIA database;
- licensed databases; and
- Internet/World Wide Web.

Integrating Information Literacy

Information literate students know how to use information and ideas effectively. The "keystone" finding of this study is the importance of an integrated approach to information literacy teaching. For school library programs to be successful agents of academic achievement, information literacy must be an integral part of the school's approach to both standards and curriculum.

Test scores increase as school librarians spend more time:

- teaching cooperatively with teachers;
- teaching information literacy skills independently;
- providing in-service training to teachers;
- serving on standards committee;
- serving on curriculum committee; and
- managing information technology.

Indirect Effects

In addition to its direct effect on academic achievement, higher levels of school library program staffing—especially certified school librarians — predict:

- higher expenditures;
- larger and more varied collections of information resources;
- increased access to information technology for teachers and students; and
- more integrated approaches to information literacy, standards and curriculum.

The more print and electronic information resources available through the school library, the greater amount of time spent by the school librarian on information literacy—that is, teaching students and teachers how to access and use such resources.

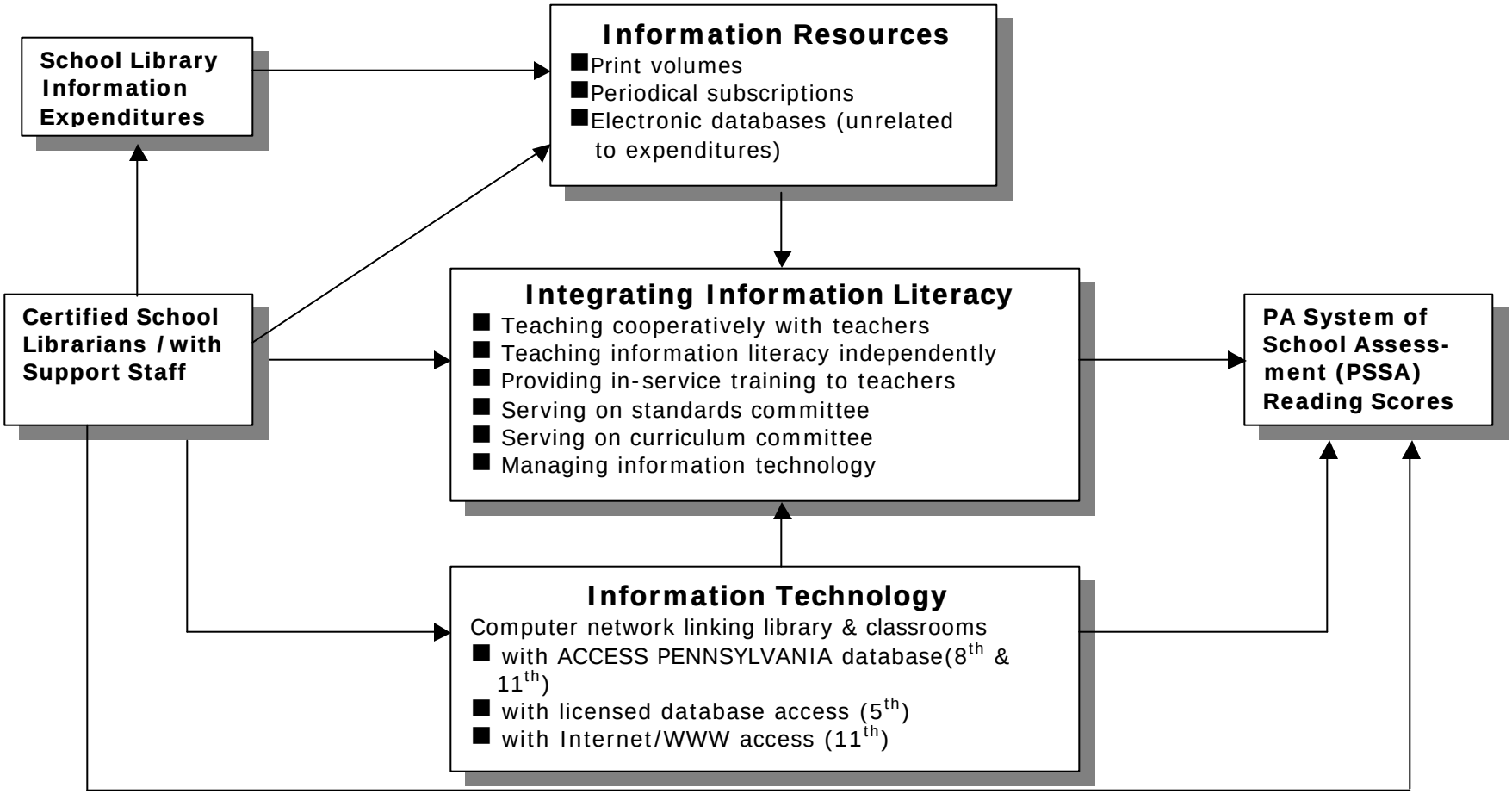
School & Community Differences

These predictors of academic achievement cannot be explained away by:

- school differences, including:
  - school expenditures per pupil;
  - teacher characteristics (education, experience, salaries);
  - teacher/pupil ratio; and
  - student characteristics (poverty, race/ethnicity), or
- community differences, such as:
  - adult educational attainment;
  - families in poverty; and
  - racial/ethnic demographics.

How Much Can Scores Rise With Good School Library Programs?

How much will a school's test scores improve with specific improvements in its school library program? The answer depends on the program's current status, what it improves, and how much it is improved. When all library predictors are maximized (e.g., staffing, library expenditures, information resources and technology, and information literacy activities of library staff), PSSA reading scores tend to run 10 to 15 points higher.



Controlling for School Differences

- School expenditures per pupil
- Teacher characteristics (education, experience, salaries)
- Teacher/pupil ratio
- Student characteristics (race/ethnicity, poverty)

Controlling for Community Differences

- Adult educational attainment
- Race/ethnicity
- Families in poverty

Figure 1
MEASURING UP TO STANDARDS
The Impact of Library Information Programs & Information Literacy in Pennsylvania Schools

Introduction

For several years, staff of the Pennsylvania Department of Education's Office of Commonwealth Libraries have been monitoring the increasingly alarming condition of library programs in the state's public schools. They concluded that the only explanation for these circumstances was that school decision-makers for school library programs—school boards, superintendents, principals, teachers, even school librarians themselves—are unaware, or insufficiently aware, of the impact that good library information programs are having in many schools, and could be having in others. By 1998, an idea began to take shape. Pennsylvania should be the first state east of the Mississippi to replicate the landmark 1993 "Colorado study," The Impact of School Library Media Centers on Academic Achievement. In mid-1998, Pennsylvania Citizens for Better Libraries (PCBL), the state's Friends of Libraries group, applied to Commonwealth Libraries for funding to make possible a Pennsylvania study. In October 1998, Commonwealth Libraries made a Library Services and Technology Act (LSTA) grant to PCBL for this purpose.

In January 1999, PCBL contracted for this study with the Library Research Service, a unit of the Colorado State Library operated in partnership with the University of Denver's Library and Information Services Department. Keith Curry Lance, Director of the LRS and principal investigator for the original Colorado study, led the study team. That team also included Marcia J. Rodney, an LRS Senior Research Analyst, and consultant Christine Hamilton-Pennell.

In addition to confirming in Pennsylvania the findings of the first Colorado study, this project sought to expand on the original study's results by determining the impact on academic achievement of:

- specific activities of certified school librarians;
- principal and teacher support of school library programs; and
- information technology, particularly licensed databases and the Internet/World Wide Web.

On all three of those counts, this Pennsylvania study was a resounding success. 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 a brief report about the Alaska, Colorado, and Pennsylvania studies, for which PowerPoint slides are also available.

Review of the Literature

This study aims to build upon previous research showing a link between student academic achievement and the school library program. With the move to standards-based education, which focuses on what students have learned (proficiencies) rather than what is taught (coverage of content), the school librarian 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 programs, from providing resources to students to creating a community of lifelong learners. Three overlapping roles are identified for school librarians 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 school librarian, those of developing the school library's collection and services and providing access to them. A third role, *program administration*, includes both management of the 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 school librarian in **Information Power: Building Partnerships for Learning** (ALA, 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 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; and
- by working with other educators to design learning strategies to meet the needs of individual students.

Presence of a School Library with a Professional School Librarian

Many studies conducted before the advent of the **Information Power: Guidelines for School Library Media Programs** (1988) 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 personnel as compared to schools without them. Student access to the school library was also significantly greater in schools with professional library 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.

Learning and Teaching

Some research studies before the advent of **Information Power: Guidelines for School Library Media Programs** in 1988 referred to various aspects of the school librarian's teaching role. Aaron (1975) studied a group of eighth grade students who participated in a program in which a full-time school librarian 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.

Much of the research taking place after the introduction of **Information Power: Guidelines for School Library Media Programs** in 1988 focuses on the instructional role of the school librarian. Lance, Welborn and Hamilton-Pennell (1993) found that students whose school librarians 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 test scores. A study by the Library Research Service in Colorado (1998a) also found that students earned higher reading scores in schools where the librarian played a vital instructional role, including planning instruction with teachers, providing information literacy instruction, providing in-service training for teachers, and evaluating students' work.

Nevertheless, several researchers have identified a gap between theory and practice. Person (1993) found a discrepancy between the real and ideal role perceptions of school librarians. 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 school librarians 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 school librarians 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. Van Deusen and Tallman (1994) found that more than half of her sample of school librarians did not assess student work at all during the study period. McCarthy (1997) studied school librarians 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.

Barriers to school librarians practicing the instructional role include the attitudes of both the school librarians and teachers, as well as program limitations such as fixed scheduling and lack of technology. Lai (1995)

found no significant differences between teachers' and school librarians' attitudes regarding the librarians' role in curriculum development, instructional development and technology use. Both groups believed the school librarian had only a marginal role in designing and producing materials for units. Giorgis (1994) discovered that the majority of elementary school teachers perceived the school librarian 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 classroom teachers, administrators, children and parents of the school librarian's role 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 school librarian occurred with the move to flexible scheduling and curriculum-integrated instruction. Fedora (1993) compared two exemplary school libraries, one with fixed and one with flexible scheduling, and found that the school librarian 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 librarians in schools that combined both flexible scheduling and team planning had significantly more curriculum involvement.

Technology can also support the instructional role. Everhart (1992) found that high school librarians 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 school librarian 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.

The most important factor in successfully implementing the instructional role is the characteristics and skills of the school librarian himself or herself. Yetter (1994) found that school librarians 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 librarians saw teaching as their primary function. As a result, the colleagues of these

librarians saw them as vital participants in the instructional process. Farwell (1998) found that school librarians 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 librarian involved in an instructional planning process showed that she contributed as a peer and helped to clarify, initiate, summarize and test the discussion ideas.

K. G. Alexander (1992) studied four exemplary school librarians 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 school library had resources to support the changing curriculum, and assisted teachers in planning classroom instruction. Gehlken (1994) studied the school library programs in three blue ribbon high schools and came to similar conclusions. In all three schools, there was a cooperative relationship between the school librarian 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 program was help from the school librarian in finding and evaluating information. Bell and Totten (1992) found that teachers employed in academically successful schools tended to choose the school librarian significantly more for cooperation on instructional problems than did teachers serving in academically unsuccessful elementary schools.

Another aspect of the school librarian's learning and teaching role identified in **Information Power: Building Partnerships for Learning** found that teachers and school librarians both strongly agreed that the librarian should work with teachers in helping students to develop the habit of reading.

The adoption of state content standards and the movement towards standards-based instruction and assessment is too recent to have a 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 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 school librarians, 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.

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 school library's resources and services, and providing a welcoming environment which is conducive to learning. 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.

More recent studies have focused on the connection between students' achievement in reading and access to print resources, particularly in libraries. The Colorado study by Lance, Welborn and Hamilton-Pennell (1993) concluded that the size of a school library's staff and collection is the best school predictor of academic achievement. 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. 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 school library 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.

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. 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.

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.

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). Krashen (1995) found that a significant predictor of NAEP reading comprehension test scores was the number of books per student in school libraries. 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 concluded 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 library use has also been positively linked to student achievement scores. 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. JoAnn Everett, a librarian in a Library Power elementary school in Chattanooga (noted in "Positive Correlation…", 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 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 school library 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 school librarian providing individual assistance to students was higher in flexible than fixed schedule situations.

The role of the school librarian in developing and providing access to the library 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 between all the school library 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.

K. G. Alexander's (1992) study of four exemplary school librarians found that they all provided continuous access to their libraries; assisted individual users; designed flexible circulation policies; used innovative methods to promote their libraries; and developed collections which supported all areas of the curriculum. Gehlken (1994) reported that in all three blue ribbon high schools studied, the school librarian 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 libraries in all three schools were organized, automated, easily accessible, and provided materials in a variety of formats across all levels and subject areas. The library facilities were inviting, aesthetically pleasing, safe, and user-friendly.

The role of technology in promoting student achievement has been the focus of some 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. 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. 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.

There is perhaps no place where the school librarian’s role has changed more in the last ten years than in the integration of technology. Nevertheless, access to technology in school libraries still varies widely.

Powell's (1998) survey of 300 elementary and secondary school libraries in Tennessee revealed a wide variability in technology access. McCarthy (1997) found that less than 50 percent of the New England school libraries in her sample had automated circulation and cataloging systems, and these were mostly in middle and high school libraries.

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 programs. Yetter (1994) observed that the school libraries 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 libraries 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 school library program.

As Wenglinksy (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 (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 program. A Library Research Service report (no. 141, 1998) concluded that students earn higher reading scores if their school library 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. Person (1993) reports that school librarians 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 school library program as expounded in **Information Power: Guidelines for School Library Media Programs** (1988).

Program Administration

The program administration role involves effective management of the human, financial and physical resources of the school library 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. Yetter (1994) found that schools that had successfully implemented resource-based learning had a common understanding and support from the principal, teaching faculty and school librarian about the centrality of the library program in the school's instructional process. These schools provided planning time for teachers and school librarians to work collaboratively, clerical support for the school librarian, flexible scheduling in the school library, and principal support of the library 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 program, adequate clerical staff, and time during the school day for school librarians and classroom teachers to plan together. Gehlken (1994) reported that in all three blue ribbon high schools, the principals actively supported and promoted the library 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 school librarians performing the instructional role. In schools where there was fiscal and organizational support for the library program, including automated systems and paid support staff, van Deusen (1996a) found that school librarians performed the instructional consultation role to a greater extent. Lumley (1994) concluded that instituting a curricularly integrated and flexibly scheduled library program required leadership on the part of the school librarian as well as principal support, resulting in strong leadership roles for the librarian in curriculum, instruction and staff development. Van Deusen (1996a) reports that the availability of support staff and automated library systems was positively related to school librarians' doing more consulting work with teachers and spending less time on nonprofessional tasks.

Lance, Welborn and Hamilton-Pennell (1993) found that school libraries 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 school librarian's instructional role increases, the size of the library'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 staffing and student achievement, especially in high school reading. Schools employing more library 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 school librarian and where the school librarian is supported by an aide.

School librarians in effective schools tend to have good planning, communication and management skills. Yetter (1994) observed that school librarians in successful learning-based schools were expert in developing effective school library programs which were congruent with the state and national guidelines published in **Information Power: Guidelines for School Library Media Programs** (1988). The basic library procedures and processes in their school library 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 program. Gehlken (1994) reported that in all three blue ribbon high schools they 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 program in an elementary school required school librarian leadership in site-based staff development and good communication with staff and principal support. The involvement of a school librarian in technology-based staff training can support student achievement. 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.

A very important administrative role for the school librarian is to obtain an adequate budget for the library program. Angelo's (1994) study of Massachusetts school library 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. Lance, Welborn and Hamilton-Pennell (1993) found that students at schools with better funded libraries 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.

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 materials has a positive effect.

Summary

The impact of school library programs on academic achievement is well documented in the research literature. Well-equipped, quality school libraries that have professional staff involved in instruction contribute to the academic success of their students. Both higher order uses of technology and expenditures for library materials support student achievement. All three roles of the school librarian identified in **Information Power: Building Partnerships for Learning** (1998) lead to greater integration of the school library program into the larger learning community and promote greater student achievement.

Methodologies

Sample

Pennsylvania has 2,234 public schools serving grades 5, 8, and/or 11. A sample of 500 school libraries was sought, and 435 (87 percent) actually participated.

In fact, throughout this study, the participants were treated as three distinct samples, one for each tested grade. The following table 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 Pennsylvania Public Schools Serving Grades 5, 8 & 11, 1998/99

Grade	Number in sample	Number in Universe	Sample as percent of universe
5th	138	1,313	10.5%
8th	183	638	28.7%
11th	201	606	33.2%

Survey

Respondent Information

The questionnaire began with several items identifying the responding school—its name and address, its lowest and highest grades, 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 lowest and highest grade figures were especially important as they made it possible to determine which tested grades (fifth, eighth, and eleventh) a school served.

Hours of the School Library

The second part of the questionnaire contained items concerning the school library's hours of operations—both during and after school in a typical school week and in a typical week during summer months. These hours were sub-divided according to whether they were supervised or unsupervised hours. Supervision was defined as the presence of the adult responsible for the library's operation. It seemed reasonable to expect that schools with higher test scores would be those with libraries that have longer hours and more supervised hours.

School Library Staff

Perhaps the most fundamental question examined by this study was the value of staffing school libraries with individuals possessing certain combinations of education and certification qualifications. 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. In addition, numbers of volunteers—both adult and student—and numbers of hours worked by them were collected. 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 is the importance of having support staff who free the professional to do his/her job.

Paid Staff Activities

While the Colorado study found strong evidence for the importance of the school librarian's instructional role, those findings were based on just two items—the number of hours library staff spend identifying and providing materials for instructional units developed by teachers and planning instructional units with teachers. The Pennsylvania 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 providing reading motivation activities. The rationale for imposing upon practitioners to parse their time so many ways was to obtain more specific insights about exactly what it is that school librarians 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 for elementary and secondary levels.

Usage of School Library Services

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: library/information literacy instruction; technology use; planning; etc. The items about technology use are especially important in assessing the role of library information technology as a facilitator of higher achievement levels. 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, commercial document delivery services). 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 Technology

A great deal of detailed information about library information technology was collected by the next section of the questionnaire. Respondents were asked to identify numbers of school computers both in or under the jurisdiction of the school library 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, with a menu option or bookmark for ACCESS PENNSYLVANIA Database, with access to the World Wide Web).

Additional questions addressed processor and connection speed, conditions of Internet access, and Internet filtering policies.

School Library Resources

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, magazines 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 of obsolete information.

Annual Operating Expenditures & Capital Outlay 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. Additional items called for expenditures on computer equipment and other capital purchases.

School Library Information Management

The last section of the questionnaire posed questions regarding how the library budget is requested and received, whether it has an advisory committee, whether its staff meet regularly with their public library counterparts, and whether any challenges or requests for reconsideration of materials have been received during the past year.

Available Data

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

Available data were incorporated in the study from publicly accessible Web sites for the following variables:

- median family income, projected for 1999;
- percentage of population below poverty lin; ande
- minority percentage of population.

The Federal Financial Institutions Examination Council maintains a site at www.ffiec.gov for the use of financial institutions reporting community investment to the government. This site allows the researcher to enter a street address and zip code and receive information at the Census Tract/BNA level, grouped under income, population and housing. While the majority of information is from the 1990 census, some variables, such as median family income, are estimated for 1999. This variable is based on Housing and Urban Development (HUD) estimates for the Metropolitan Statistical Area (MSA) or non-MSA area where the school is located. The income module of this site provided the numbers used in this study for percentage of the population below the poverty line and projected median family income for 1999.

When data was not available through the FFIEC site, it was extracted from the U.S. Census American Factfinder module at www.census.gov. The 1999 median family income figures were extrapolated from the 1990 census using an index multiplier to account for the intervening change in the consumer price index. Poverty figures were based on 1990 census data.

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

Both the FFIEC and U.S. Census sites provided minority percentage figures based on the 1990 census. The FFIEC provided the figures at the census tract level based on the school's address. When this information was unavailable from FFIEC, it was obtained from the U.S. Census site at the municipality level.

For each school, enrollment by race and ethnicity was provided by the Pennsylvania Department of Education. Categories included were Native American, Asian/Pacific Islander, Black, Hispanic, and White. Four of these variables, Native American, Asian/Pacific Islander, Black and Hispanic, were then combined to determine the minority percentage of the school population. Both school and community 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 provided by the Pennsylvania Department of Education. The variable refers to the percentage of people age 20 and up with a high school diploma or equivalency or higher. The Pennsylvania Department of Education provided data at the zip code level based on the 1990 census.

Total school expenditure data was also provided by the Commonwealth on a district level. 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 the full-time faculty in each district by examining average years of service, average salary for a full-time faculty member, and percentage of teachers in each district with a minimum of a master's degree. These figures were provided by the Pennsylvania Department of Education. District percentages were then accorded to each school within that district.

The test scores used as indicators of students' academic achievement in this study are 1999 scores on the Pennsylvania System of School Assessment (PSSA) reading test. This test was administered to all fifth, eighth, and eleventh graders—except those excused by their parents—last February. Thus, one of the major criteria for a school entering the study sample was that its enrollment include students in fifth, eighth, and/or eleventh grade. While there are PSSA tests in a variety of curriculum areas, reading scores only were utilized in this study because they are very highly correlated with scores for mathematics (the other most regularly and comprehensively tested subject) and other tested subjects.

Crosstabulation and Chi-Square

Crosstabulation combines data on two or more different variables in one table, thereby identifying the numbers of cases for each potential combination of the variables in question. This statistical technique is appropriate only for categorical variables or others with very small numbers of values. Each cell in a crosstabulation table represents a unique combination of values on the variables in question. For example, in this study, Pennsylvania school libraries are crosstabulated based on whether they had a school librarian full-time, part-time, or not at all and whether their schools' test scores were average or above or below average. If the presence of a school librarian was unrelated to test score performance, one would expect there to be fairly equal numbers of schools in each cell. As predicted, that was not the case. The results of this and related analyses will be reported later.

The common test of statistical significance for relationships between categorical variables is Pearson's Chi-square. The value of Chi-square itself as well as its significance level depends on the overall number of cases under study, the number of cells in the crosstabulation table, and the number of cases in each cell. A key assumption related to use of Chi-square is that the expected number of cases per cell is not very small. For instance, when the number of cases per cell is very small—say five—Chi-square cannot be calculated with precision or reliability.

Statistical Significance

Statistical significance is an often-misunderstood concept. Usually, when a statistical difference between two groups is reported, the first question someone asks is "Is that difference significant?" In this context, the intuitive response is to question the magnitude or size of the difference. 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.

Another aspect of "significance" is reliability or consistency. When a sample is studied, instead of the entire universe (in this case, library information programs in Pennsylvania 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.

Throughout this study, statistical significance is reported for the Chi-square test on crosstabulations and for Pearson's product-moment correlation coefficients in both bivariate and partial 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 school librarian staff hours to students and PSSA 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 making that decision, three generally accepted criteria were followed:

- If (r) was under .60, both variables were at least initially retained.
- If (r) was over .80, the one with the lower (r's) for the larger number of other variables was retained, and the other discarded.
- If (r) was between .60 and .80, the variables were combined by addition.

Partial Correlation

Partial correlation was used to weigh the effects of school library staffing on academic achievement while controlling for each of several school and community conditions. 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 another.

It is very important to note that these kinds of statistical analysis—crosstabulation and bivariate and partial correlation—make two kinds of assumptions. They assume causal order. For this study, previous research and practical experience suggest the presumed sequence of cause and effect. It is intuitively obvious that the status of library information programs may depend on more general school circumstances, just as those circumstances, 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 presents some problems for this study. Without apology, its focus is on assessing the impact of school library programs 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 school library 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 school library staff integrating information literacy into their schools and test scores might be a spurious result of community affluence or socio-economic advantages was addressed by considering several alternative measures of those conditions.

For all statistical techniques, separate analyses were conducted for elementary, middle, and high school levels.

After the direct effects of all school library conditions on test scores were determined via bivariate and partial correlation, their indirect effects from one to another were calculated.

Findings

The first important achievement of this study is to establish that there is a link between the presence of adequate school library staffing and higher academic achievement (as indicated by PSSA reading scores). In fact, however, the relationship between library staffing and PSSA reading scores is stronger than that. School library staffing is correlated with such scores. As library staffing rises, reading scores rise. This correlation is not explained away by other school conditions, such as per pupil expenditures by schools or the teacher-pupil ratio. Likewise, the relationship is not explained away by community conditions, such as poverty and low adult educational attainment. Several characteristics of school library programs beyond staffing help to explain the relationship between library staffing and academic achievement. These characteristics include: school library expenditures, information resources, information technology, and staff activities that help to integrate information literacy into the school's approaches to standards and curricula. (See Figure 1, p. 9.)

Presence of Adequate School Library Staffing Linked to Higher PSSA Reading Scores

The success of any school library information program in promoting high academic achievement depends fundamentally on the presence of adequate staffing—specifically each library should have at least one, full-time, certified school librarian with at least one full-time aide or other support staff member. For all three tested grades, the relationship between such staffing and PSSA reading scores is both positive and statistically significant.

In 1998/99, three out of five Pennsylvania elementary schools with adequate school library staffing (61 percent) reported average or above reading scores, while the same proportion of such schools with inadequate library staffing reported below average scores. (See Table 2.)

Table 2. Fifth Grade PSSA Reading Scores by Presence or Absence of School Librarian with Support Staff, 1998/99

Library Information Librarian with Support Staff	5th Grade PSSA Reading Scores				Total	
	Average or Above		Below average			
Present	62	60.8%	40	39.2%	102	100.0%
Absent	14	38.9%	22	61.1%	36	100.0%
Total	76	55.1%	62	44.9%	138	100.0%

Chi-square = 5.156, $p < .05$

The same year, two out of three middle schools with adequate school library staffing (66 percent) reported average or above reading scores, while three out of five such schools with inadequate staffing (59 percent) reported below average scores. (See Table 3.)

Table 3. Eighth Grade PSSA Reading Scores by Presence or Absence of School Librarian with Support Staff, 1998/99

School Librarian with Support Staff	8th Grade PSSA Reading Scores				Total	
	Average or Above		Below average			
Present	79	66.4%	40	33.6%	119	100.0%
Absent	26	40.6%	38	59.4%	64	100.0%
Total	105	57.4%	78	42.6%	183	100.0%

Chi-square = 5.156, $p < .001$

The same year, almost three out of five high schools with adequate school library staffing (57 percent) reported average or above reading scores, while three out of five such schools with inadequate library staffing (59 percent) reported below average scores. (See Table 4.)

Table 4. Eleventh Grade PSSA Reading Scores by Presence or Absence of School Librarian with Support Staff, 1998/99

School Librarian with Support Staff	11th Grade PSSA Reading Scores					
	Average or Above		Below average		Total	
Present	78	57.4%	58	42.6%	136	100.0%
Absent	27	41.5%	38	58.5%	65	100.0%
Total	105	52.2%	96	47.8%	201	100.0%

Chi-square = 4.409, $p < .05$

The findings of this analysis are consistent across all three tested grades. Students are more likely to earn above average test scores in schools with adequately staffed school library programs.

PSSA Reading Scores Increase as School Library Staffing Increases

Further analysis indicates that the relationship between school library staffing and academic achievement is even stronger than it appeared when simply dividing schools between those with more and fewer library staff and higher and lower test scores. The relationship between library staffing and student performance is incremental: as school library staffing increases, reading scores increase.

Two or More Heads are Better

Rebecca Casiano is the Supportive Service Assistant at Roberto Clemente Middle School in Philadelphia, PA. Her work is vital to the success of the school library media program with our predominantly Hispanic student body. Ms. Casiano is fluent and literate in both English and Spanish. Because she lives close to the school, she knows many of the students and their families from the neighborhood.

Our students are not readers. With Ms. Casiano's help, we run thematic English and Spanish literacy-based contests which are very popular with our students. She is a vital link to our Spanish speaking parents. Ms. Casiano's involvement has caused our circulation to double and then triple, to well over 1,000 books a month, increased use of our computer services by two-fold, and guided development of our Spanish language collection.

We have had to hire an additional clerk due to demand. Ms. Casiano is now a college student, majoring in Information Technology to be followed by a master's degree in Library Science. We are proud of her accomplishments and very pleased to have her assistance.

Carol Heinsdorf, Librarian
Roberto Clemente Middle School
Philadelphia

Simple correlation does not equal cause, but the evidence for a causal relationship mounts as the other factors that might explain away the relationship are ruled out. Comparing the bivariate correlation coefficients for library staffing and reading scores with partial correlation results controlling for potentially influential outside factors (i.e., other school and community conditions) reveals that none of these other factors explains away that relationship. There is a consistently positive and highly statistically significant relationship between library staffing and academic achievement. Indeed, when some other factors are controlled, the relationship between staffing and student performance is even stronger.

When the relationship between library staffing and test scores is controlled for differences in school size, spending, teacher-pupil ratio, and teachers' education and experience, the relationship is neither weakened nor strengthened dramatically. Only one teacher characteristic—average salary—weakens the relationship between library staffing and test scores across all tested grades. Notably, this salary average includes the salaries of certified school librarians. (See Table 5 .)

Table 5. School Library Staffing as Predictor of PSSA Reading Scores Controlling for Selected School Conditions, 1998/99

Control variable	Correlation between Librarian/support staff & PSSA reading scores		
	5th Grade	8th Grade	11th Grade
None (bivariate correlation)	.215 *	.252 *	.274 *
Partial Correlations			
Enrollment (i.e., school size)	.215 **	.196 **	.258 **
Per pupil expenditures	.286 **	.190 **	.252 **
Teacher-pupil ratio	.197 *	.264 **	.269 **
Teacher characteristics			
Percent of teachers with master's degrees	.191 **†	.206 **	.245 **
Teacher's average years of experience	.241 **†	.244 *	.280 **
Average teacher salary	.147 *†	.123 *†	.158 *

*Correlation is significant at the 0.05 level
** Correlation is significant at the 0.01 level
†Correlation is one-tailed

When the relationship between school library staffing and test scores is controlled for socio-economic differences, the relationship reveals itself to be a dynamic one in several ways. (See Table 6.)

When the relationship between school library staffing and achievement is controlled for differences in adult educational attainment, the relationship is weakened for all three tested grades. The relationship is weaker still, however, at the high school level compared to the elementary and middle school levels. This finding suggests that school library programs can compensate better for a lack of parental education before rather than after students reach the mid to late teens. This finding highlights the importance of school libraries with professional staffing in elementary schools.

When the relationship between school library staffing and achievement is controlled for the race/ethnicity of students, it is weakened slightly at elementary level and remains little changed at middle school level, but increases dramatically at high school level. This finding suggests that, while school library programs are challenged to compensate for the cultural disadvantages of many minority children in the early years of public education, those programs are more successful at compensating for such disadvantages as students mature.

A Little Help Goes a L-o-o-o-ng Way

I have a full day of classes. The last class just reminded me of why we need more clerical staff. I did a 10 minute lesson and let the kids loose on Pearl Harbor, Hiroshima, and Manzanar. While I worked with the kids, my aide ran around the whole period dealing with rebooting computers that lost network connection, print problems, and assisted kids in logging on. I have a volunteer checking in books and a student aide doing a bulletin board. So we need additional staff just to address technology tasks and problems.

An additional part-time aide enables us to process material in a more timely manner. Because research skills instruction and planning with teachers are priorities, the processing backlogged. So more clerical time allows me more time for instruction, planning projects with teachers, and time for PR such as displays, bulletin boards, supervision of library aides, and volunteers.

One of our elementary libraries was without an aide. Our middle school library aide was given another duty part of the school day and was not available during a very busy part of the day. We wrote a proposal outlining the current state of affairs and what could be accomplished by adding clerical help. One of our best volunteers was hired in that capacity.

Nancy Smith, Librarian
Susquehanna Township High School

Predictably, economic differences (e.g., median family income, percent of families living in poverty) have the most consistently undermining effect on the relationship between school library staffing and reading scores. It is difficult for the best school library program to foster students' learning when their home life is defined by the privations of poverty. Children from poorer families are less likely to live in homes where books and other information sources are readily at hand, and where a home computer providing access to the World Wide Web can be taken for granted. Nonetheless, even when economic differences are ruled out, the relationship between school library staffing and test scores remains both positive and statistically significant.

Table 6. School Library Staffing as Predictor of PSSA Reading Scores Controlling for Selected Community Conditions, 1998/99

Control variable	Partial correlation between Librarian/support staff & PSSA reading scores		
	5th Grade	8th Grade	11th Grade
None (bivariate correlation)	.215 *	.252 *	.274 *
Partial Correlations			
Percent of adults graduated from high school	.194 *	.191 **	.129 *†
Percent of students from racial/ethnic minority groups	.177 †	.291 **	.381 **
Socio-economic conditions			
Median family income	.146 †		
Percent of families in poverty		.133 *†	.185 **

*Correlation is significant at the 0.05 level
** Correlation is significant at the 0.01 level
†Correlation is one-tailed
Note: Shaded cells indicate the absence of a positive, statistically significant relationship of .100 or greater. The absence of statistical significance is frequently attributable to an inadequate number of reporting cases on the variable in question.

While controlling for some school and community conditions (e.g., average teacher's salary, community socio-economic conditions) weakens the relationship between school library staffing and achievement, more often there is little change, and, in one case (e.g., race/ethnicity), the relationship is even strengthened over time.

Because none of these other factors explains away the relationship between school library staffing and achievement, that relationship is likely to be one of cause-and-effect. This analysis revealed no evidence to support claims that the relationship is explained by an antecedent variable (i.e., something else that causes both library staffing and achievement). Whether there might be intervening factors—ones attributable to school library staffing that promote achievement—is another issue.

School Library Staffing Linked to Library Expenditures, Information Resources and Technology, and Integrating Information Literacy

Given that there is a positive, statistically significant relationship between school library staffing and achievement—by all indications, a cause-and-effect relationship—the obvious next question is "How does such staffing result in higher PSSA reading test scores?"

At all three school levels, school library staffing is correlated consistently with the level of school library expenditures and the number and variety of available information resources (e.g., books, periodicals, databases). For grades 5, 8, and 11, as weekly hours of school librarians—alone and in combination with support staff hours—increase, both expenditures on school library programs and the size of their collections increase. (See Table 7.)

Helping Hand Gives Machines a Boost

Hands-on instruction works the best. When students need help with a CD-ROM or the Internet, I stand alongside them and suggest search terms or tell them step by step about individual components of a web page. This year, I have six working computers and a printer. So it is much easier for the kids to get what they need.

I encourage use of different Web sites at this early stage of research because the Internet is so vast and I think it is more important to discover it. Also, when a student needs several Internet resources, they can compare different writings and angles. I believe the students should have as much experience as possible using all resources to discover the differences in all of them.

I am on the Internet a lot of the time reading newsletters and investigating new sites, so I know where to find much of the information the kids need. I've even developed a Web site that teachers use for their classes.

Karen Huber
Indian Valley High School
Lewistown

At all three school levels, school library staffing also demonstrated a consistently positive and statistically significant relationship to a combination of library staff activities related to integrating information literacy into the school's approach to standards and curricula. These staff activities, particularly those of the school librarians, include teaching cooperatively with teachers, providing in-service training to teachers, meeting with standards and curriculum committees, providing information skills instruction to groups or individuals, and managing information technology. As school library staffing increases, the typical weekly hours spent on this combination of activities also increases. (See Table 7.)

At both elementary and secondary levels, increases in library staffing are also linked to increased access to computer resources. Notably, computers counted in this study are those either in or under the jurisdiction of the school library program as well as any computer elsewhere in the school—in classrooms, computer labs, studios, or offices—that have networked access to library resources. (See Table 7.)

An interesting distinction in these findings between elementary and secondary levels is that, for both levels, as library staffing increases, computers with access to licensed databases increase, while, for secondary level alone, staffing increases are linked with increases in computers with Internet/World Wide Web access. These findings probably reflect the increasing time and money commitments of most librarians to licensing and promoting use of well-organized, up-to-date, high-quality databases as well as the active concern of some public officials and interest groups about very young children having completely open access to the Web.

Table 7. School Library Staffing as Predictor of Other Characteristics of Pennsylvania School Library Programs, 1998/99

Correlation of school librarian—alone & with support staff	5th Grade		8th Grade		11th Grade	
	Librarian Alone	Librarian w/support staff	Librarian Alone	Librarian w/support staff	Librarian Alone	Librarian w/support staff
School Library expenditures	.300 **	.220 *	.197 **	.427 **	.329 **	.439 **
Information resources						
Print volumes	.338 **	.286 **	.275 **	.541 **	.360 **	.404 **
Periodical subscriptions	.195 *	.185 *	.133 *†	.280 **	.177 *	.275 **
CD-ROM reference titles (combined with print)	.372 **	.292 **	.294 **	.539 **	.408 **	.488 **
Information technology						
Library & networked computers	.373 **	.298 **			.169 *	.154 *
with access to library databases	.263 **	.277 **	.174 *†		.267 **	.151 *†
with Internet access				.174 *†		.183 *
Integrating information literacy+	.433 **		.363 **	.306**	.399 **	.350 **

+Combined weekly hours spent teaching cooperatively with teachers, providing in-service training to teachers, meeting with standards and curriculum committees, providing information skills instruction to groups or individuals, and managing information technology

*Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

†Correlation is one-tailed

Note: Shaded cells indicate the absence of a positive, statistically significant relationship of .100 or greater. The absence of statistical significance is frequently attributable to an inadequate number of reporting cases on the variable in question.

School Library Expenditures Linked to Information Resources

In Pennsylvania, as throughout the nation, most school library program budgets include funds for information resources, supplies, and other operating costs specific to the library program. Generally, these budgets do not include the funds that cover the salaries and benefits of staff. Thus, it is little surprise that library expenditures correlate positively, strongly, and statistically significantly with the size of the library program's collection of traditional print information resources, specifically print volumes and periodical subscriptions.

Table 8. School Library Expenditures as Predictor of Pennsylvania School Library Information Resources, 1998/99

Correlation of school library expenditures	5th Grade	8th Grade	11th Grade
Information resources			
Print volumes	.341 **	.425 **	.372 **
Periodical subscriptions	.434 **	.379 **	.277 **

** Correlation is significant at the 0.001 level

Plant a Dollar, Reap a Harvest

My library budget was increased from $10,000 in 1997-98 to $20,000 in 1998-99. I was able to weed out practically the entire 900 section, re-supply the out-dated history and geography books, and renew the 300 section of the collection, as well as purchase a security system to protect against loss of these valuable new materials. Faculty response has been terrific! With this improved collection, I am better able to convince my students and faculty to use books FIRST, before resorting to the Internet for fast, reliable information for their projects.

Mary Jane Zimmerman, Demonstration Librarian
William Penn High School
Philadelphia

Information Resources Linked to Integrating Information Literacy

The mere presence of a large collection of books, magazines, and newspapers in the school library is not enough to generate high levels of academic achievement by students. Such collections only make a positive difference when they are part of school-wide initiatives to integrate information literacy into the school's approach to standards and curricula. Rich collections of information resources can only help to improve the learning environment if the school librarian is in a position to mobilize them to that end. As the correlation coefficients reported in Table 9 indicate, the relationship between having access to such resources and having school librarians who are actively engaged in enriching the learning environment is important at all grade levels, but is especially important at the elementary level.

Table 9. Information Resources as Predictors of Integrating Information Literacy in Pennsylvania Schools, 1998/99

Correlation of integrating information literacy	5th Grade	8th Grade	11th Grade
Information resources predictors			
Print volumes	.359 **	.247 **	.242 **
Periodical subscriptions	.341 **		
CD-ROM reference titles	.222 *		
Information resources combined	.324 **	.252 **	.284 **

+Combined weekly hours spent teaching cooperatively with teachers, providing in-service training to teachers, meeting with standards and curriculum committees, providing information skills instruction to groups or individuals, and managing information technology

*Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

Note: Shaded cells indicate the absence of a positive, statistically significant relationship of .100 or greater. The absence of statistical significance is frequently attributable to an inadequate number of reporting cases on the variable in question.

Books and Bucks

When I came to my district, library collections were pretty poorly funded. Those in control of the money didn't know what an impact good libraries with good collections and good librarians can have. In 1989, my first year here, my book budget was about $1,200. This year it was about $19,000, and that's for a library serving about 500 kids!

The specific collection development idea I wanted to mention is our Parenting Collection. I initially received $400 in grant money to fund the purchase of books on topics that parents were about. Numerous parents have remarked about what a great idea it is and how the titles that were chosen were very helpful. I promote this collection (and our collection as a whole) every chance I get. One parent mentioned how her son was diagnosed with ADHD and she found the books very helpful as she didn't know much about it or what to do to help her son with school work.

We now have such collections in two of our three elementary libraries. Parents may check them out at any time. I also set up a table display in the hall during parent/teacher conferences, the evening of our Education Fair (which highlights student work) and at other times when appropriate, such as PTO meetings. We have expanded to include videotapes and cassette tapes as well. I believe that this collection is an example of reaching out to the school community to promote what we can do!

Karen L. Fleeger
Sara Lindemuth Primary School
Harrisburg

A Dirty Book Story

Students routinely bypassed the books in our fiction section. Books were dirty and old, and very worn. Both high school and middle school students are served by our library, but high schoolers seldom took the fiction books out, or browsed them. New students would come to me excited about new books they wanted to read, but I could only direct them to our ACCESS PENNSYLVANIA Database interlibrary loan system.

Four years ago, the Library Power program and a grant from principal Barbara Bravo brought an infusion of funds. We started weeding our collection of books and reference works. With our new approach to reading and literature, we have spent money and time creating a literary room out of half our library space. There are large pillows and a window seat for kids to curl up and read for fun. We brought both literature and folklore into the room. Collections such as the Bernard Evslin Monsters of Mythology series, the Library of America series, and lots of paperback series books have tempted many more students to read for fun.

Now when we open before school in the mornings, there are students seated in the literary room, poring over leisure reading books. They've even asked if I would set up a cappucino bar, so that we can be a full service library!

Paul Scaer
J.R. Masterman School
Philadelphia

Cleaning Up for the Next Century

Five years ago there was grumbling about the age of the books in our 11 elementary school libraries. With the support of Dr. Jean Dyszel, our Assistant Superintendent, we prepared a collection development plan resulting in additional funds, over $120,000, to purchase new library books.

How did we do this? First we held a collection development workshop with Debra Kachel, librarian at Ephrata High School and nationally known consultant and author. All district librarians assisted in the library collection assessments. Then we compiled statistics on the collections' ages. Librarians identified specific areas and numbers of books needed to upgrade each library. With graphs, charts, and a five-year plan, Dr. Dyszel presented the libraries' needs to the administration and board of education. They granted all the requested money.

Now, after extensive weeding and adding hundreds of new books, our students have access to collections, designed to meet the research and leisure reading needs for the 21st century. The students, librarians and teachers love the new books!

Jean H. Tuzinski
Library Department Chair
West Shore School District
New Cumberland

Information Technology Linked to Integrating Information Literacy

The successful integration of information literacy into a school's approaches to standards and curricula depends on more than traditional library resources alone. In today's global information-based economy, information technology plays as important a role in promoting students' academic achievement as it does their later financial success. At both elementary and secondary levels, activities involved in integrating information literacy happen more often where school library programs have carefully developed, well organized, widely deployed computer networks.

The successful integration of information literacy in a school depends, in part, on the school library program managing a computer network that provides access to the library's catalog, ACCESS PENNSYLVANIA database, other licensed databases, and the Internet/World Wide Web. Such networks are not limited to computers in or under the jurisdiction of the school library program, but can—and should—include networked computers throughout the school, so that students and teachers can access needed information in classrooms, labs, studios, and offices.

Table 10. Information Technology Predictors of Integrating Information Literacy in Pennsylvania Schools, 1998/99

Correlation of integrating information literacy+	5th Grade	8th Grade	11th Grade
Information technology predictors			
Library/networked computers	.251		.173
with access to library's licensed databases	.408 **		.269 **
with Internet access	.249		.169
with ACCESS PA bookmark or menu item		.142 *†	.206

+Combined weekly hours spent teaching cooperatively with teachers, providing in-service training to teachers, meeting with standards and curriculum committees, providing information skills instruction to groups or individuals, and managing information technology

*Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

†Correlation is one-tailed

Note: Shaded cells indicate the absence of a positive, statistically significant relationship of .100 or greater. The absence of statistical significance is frequently attributable to an inadequate number of reporting cases on the variable in question.

Just another day in a plugged-in high school library…

A high school freshman enters the school library with his book-bag and his laptop. He chooses a study carrel, plugs in the laptop and begins his homework. First he logs on to the campus network and opens his personal e-mail account to check for further assignments or messages from his teachers. He opens Microsoft Word and saves a biology assignment in a document. Then he opens the online school "card catalog" and searches for books on taxonomy for his biology assignment. He goes to the shelves, and with the help of a librarian, chooses an appropriate book. Going back to his study carrel, he locates information in the book about the plants assigned to him and then opens Microsoft Word and begins taking notes on his screen.

After about 10 minutes of notetaking, he clicks on Netscape and enters the Internet world. He opens the science site recommended to him by his teacher in the e-mail message and views The Science Learning Network. As he identifies additional characteristics of his assigned plants, he adds the information to his notes in Word.

Near the end of his class period, he opens his Netscape Bookmarks and opens a Wall Street site to check a stock that he has been tracking daily for his Economics class. These activities are not the exception but the rule in the library at the Kiski School.

Diana G. Murphy, Head Librarian
The Kiski School
Saltsburg

Staffing + Technology = Integration

In September of 1998, Centerville Middle School received a blind seventh grader. Providing library services and accessibility to resources in the library was a priority. After receiving technology money from Link-to-Learn and the school district's technology budget, our school library was able to purchase a Windows NT station that could handle special equipment for this student. By using screen reading software, a scanner with speech access software, an external speech synthesizer, a Braille embosser, and a sighted person as a reader, we are able to provide all materials to our blind student that other students are able to access .

We are able to provide this, not only because of the equipment, but also because the school library employs a part-time secretary/aide. The aide acts as a reader when the student uses printed texts in the library, helps scan material and then edits the material so that the student can then listen to the information and take notes in the library. Information can also be sent to a Braille embosser so that the student may take the information home. The student is also learning how to use the screen reading software so that he will independently be able to use the library databases such as the card catalog, magazine indexes, electronic encyclopedias and the Internet.

Cathi Fuhrman, Library Dept. Chair
Centerville Middle School Library
Lancaster

PSSA Reading Scores Linked Directly to School Library Staffing, Information Technology and Integrating Information Literacy

Three sets of factors are directly related to the academic achievement of students: library staffing, information technology, and integrating information literacy. (See Table 11.)

Part of a Curriculum Team

In my school the librarian is an integral part of the High School Steering Committee, which is made up of five Area Coordinators and other school leaders, such as the Technology Director. We meet monthly and together we make decisions about many building-wide policies, most importantly, future curriculum directions.

We review all curriculum proposals and decide which course changes and initiatives will be presented to the board. Not only do I get to provide input from my vantage point of viewing the school's curriculum as a whole, but I also get to know in advance which content areas to emphasize in collection development.

Allison Hutchison, Librarian
Bald Eagle Area High School
Wingate

As the correlation coefficients reported in Table 11 indicate, the value of school library staffing as a predictor of test scores increases steadily by grade level. When most children enter school, their performance is influenced powerfully by their home environments. There is no denying those conditions remain important throughout students' school careers. However, the more time teachers and school librarians have to influence students, the greater the opportunity for a positive impact.

While access to information technology is an important predictor of test scores at both elementary and secondary levels, it varies meaningfully between levels. At the elementary level, test scores correlate with the mere presence of computers and with the access they provide to licensed databases. At the high school level, scores are predicted by the availability to students of computers with access to the Internet/World Wide Web. (The lack of such correlations at the middle school level is considered an anomaly and is attributed to the relatively small number of cases for eighth grade compared to grades five and eleven.)

In addition to school library staffing levels, the constellation of staff activities that help to integrate information literacy in the school is a consistent predictor of test scores for all tested grades. From elementary to secondary level, this relationship becomes both stronger and more statistically significant.

Table 11. School Library Program Predictors of PSSA Reading Scores, 1998/99

Correlation of PSSA + reading test scores	5th Grade	8th Grade	11th Grade
School librarian with support staff	.215 *	.252 *	.274 *
Information technology **Library/networked computers**	.229 *		
with licensed database access	.283 **		
with Internet access			.132 *†
Integrating information literacy ++	.148 *†	.133 *†	.185 **

+Pennsylvania System of Student Assessment (PSSA)

++ Combined weekly hours spent teaching cooperatively with teachers, providing in-service training to teachers, meeting with standards and curriculum committees, providing information skills instruction to groups or individuals, and managing information technology

*Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

†Correlation is one-tailed

Note: Shaded cells indicate the absence of a positive, statistically significant relationship of .100 or greater. The absence of statistical significance is frequently attributable to an inadequate number of reporting cases on the variable in question.

Team Teaching Good Judgement

I have put together a lesson with our 10th grade speech teacher concerning the authority and validity of Internet sites. I have worked up a handout concerning the interpretation of domain names. This includes a copy of "Authority and validity checklist for Internet Sites" from the summer 1997 issue of *Learning & Media* on the reverse of this handout. After distributing and going over the handout, the teacher and I use an overhead display of various Web site addresses to reinforce the lesson and promote class discussion and participation. We project several different sites with our LCD projector and show the students where credits and colophons for different sites can be found and how they can be used to authenticate a site. This lesson will be used when the teacher discusses the importance of using credible sources when doing research for informative speeches and debates.

Peggy Mourer
Seneca Valley Intermediate High School
Harmony

How Highest and Lowest Scoring Schools Compare on School Library Predictors of Academic Achievement

When PSSA reading scores are converted to the familiar 100 point scale, the differences between the highest and lowest scoring schools are apparent for all three tested grades. Likewise, the differences between their school library programs are dramatic. (See Tables 12, 13, and 14.)

PSSA Reading Scores

Students at the highest scoring schools averaged reading scores in the upper 80's, while their counterparts at the lowest scoring schools averaged scores in the mid-70's. For fifth and eleventh graders, the average scoring difference was 10 points, and, for eighth graders, 15 points.

School Library Expenditures

Higher achieving schools often spend twice as much—or more—on their school library programs as lower achieving schools. At the elementary level, annual school library spending average over $14,000 and just over $7,000, respectively, for higher and lower achieving schools. At the high school level, higher scoring schools spend about $22,000, while lower scoring schools spend less than $10,000. Such differences in buying power have been demonstrated to have a direct effect on the size of the school library program's collection of information resources.

School Library Staffing

While school librarians are common among the schools participating in this study, the level of such staffing varies. The level of certified school librarian staffing varies as much as six hours per week in middle schools. Differences in the level of support staffing are even more dramatic. At elementary and middle schools, higher achieving schools have 25 to 35 hours per week, respectively, of support staff, while lower achieving schools average half as much help, if any at all. When support staff is limited or non-existent, school librarians are not free to manage library expenditures, resources, and technology or to engage in key activities that ensure the integration of information literacy into a school's approaches to standards and curricula.

School Library Resources

The numbers of print volumes, periodical subscriptions, and CD-ROM reference titles available via school library programs at higher and lower achieving schools also vary substantially. While the collection at a typical lower achieving elementary school is only about 9,000 items, its counterpart at a higher achieving school exceeds 12,000—a difference of almost one-third. This gap closes somewhat for middle and high schools, but higher achieving schools still tend to have six or seven items in their collections for every five items found in lower achieving schools.

Information Technology

The most dramatic statistical difference between lower and higher achieving schools is in the area of information technology. The typical higher achieving elementary school has 40 to 50 computers either in or networked to the school library, while lower achieving schools average only 6 to 10. At the high school level, higher achieving schools average 75 to 100 computers compared with 20-25 for lower achieving schools.

Integrating Information Literacy

Finally, higher and lower scoring elementary schools are distinguished by the amount of time school library staff spend in teaching students and teachers how to access and use print and electronic information resources. At higher achieving schools library staff spend three days on such activities for every two by lower achieving schools. Small investments of time in key activities pay off. At higher achieving schools at all grade levels, library staff are involved in committees and provide in-service training to teachers. Library staff at lower achieving schools usually do not engage in these activities at all.

Table 12. Comparison of Highest and Lowest Scoring Schools on Key School Library Predictors of 5th Grade PSSA Reading Scores, 1998/99

5th Grade PSSA Reading Scores & Predictors	25 Highest Scoring Schools		25 Lowest Scoring Schools		Percent Difference (lowest to highest)	
	Mean	Median	Mean	Median	Mean	Median
PSSA Reading Scores (100 point scale)	90.02	89.38	76.40	78.75	18%	13%
Library Expenditures						
(from school budget)	7,240	5,300	4,928	3,800	47%	39%
School Librarian / with Support Staff						
Weekly librarian hours	34.31	38.13	29.36	32.00	17%	19%
Weekly support staff hours	25.92	25.50	12.48	0.00	108%	
Information Resources						
Print volumes	10,856	12,069	8,876	9,439	22%	28%
Periodical subscriptions	22.76	22.00	21.20	20.00	7%	10%
CD-ROM reference titles	45.64	12.00	35.46	3.50	29%	243%
Total	**10,930**	**12,209**	**8,940**	**9,463**	**22%**	**29%**
Information Technology						
Library/networked computers	**52.50**	**41.50**	**10.82**	**6.00**	**385%**	**592%**
with licensed database access	38.94	25.50	5.76	0.00	576%	
with Internet access	25.84	5.00	10.06	4.00	157%	25%
with ACCESS PENNSYLVANIA	11.39	0.00	4.24	1.00	169%	-100%
Integrating Information Literacy						
Weekly hours spent						
Teaching cooperatively w/classroom teachers	2.73	1.00	1.96	0.75	39%	33%
Providing info instruction to individuals or groups	11.33	10.00	7.92	6.50	43%	54%
Providing in-service training to teachers	1.27	1.00	0.37	0.00	244%	
Serving on standards committee	0.57	0.25	0.50	0.50	14%	-50%
Serving on curriculum committee	0.95	0.25	0.28	0.00	237%	
Managing information technology	6.57	4.00	4.04	2.00	63%	100%
Total	**24.32**	**22.70**	**15.90**	**14.00**	**53%**	**62%**

Table 13. Comparison of Highest and Lowest Scoring Schools on Key School Library Predictors of 8th Grade PSSA Reading Scores, 1998/99

8th Grade PSSA Reading Scores & Predictors	25 Highest Scoring Schools		25 Lowest Scoring Schools		Percent Difference (lowest to highest)	
	Mean	Median	Mean	Median	Mean	Median
PSSA Reading Scores (100 point scale)	88.93	88.75	73.50	74.38	21%	20%
Library Expenditures						
(from school budget)	14,506	14,450	8,386	7,100	73%	104%
School Librarian / with Support Staff						
Weekly librarian hours	38.40	40.00	37.63	37.50	2%	7%
Weekly support staff hours	30.30	35.00	15.80	0.00	92%	
Information Resources						
Print volumes	13,507	13,000	10,744	9,500	26%	37%
Periodical subscriptions	48.04	37.00	40.24	40.00	19%	-8%
CD-ROM reference titles	11.38	6.00	10.09	3.00	13%	100%
Total	**13,514**	**12,959**	**10,893**	**10,025**	**24%**	**29%**
Information Technology						
LIC/networked computers	**85.16**	**70.00**	**56.41**	**37.00**	**51%**	**89%**
with licensed database access	56.17	33.50	27.00	6.00	108%	458%
with Internet access	72.17	59.50	40.41	28.00	79%	113%
with ACCESS PENNSYLVANIA	33.44	9.50	41.65	6.00	-20%	58%
Integrating Information Literacy						
Weekly hours spent						
Teaching cooperatively w/classroom teachers	10.50	7.00	6.21	2.00	69%	250%
Providing info instruction to individuals or groups	10.35	8.00	10.20	8.00	1%	0%
Providing in-service training to teachers	1.09	1.00	0.84	0.00	30%	
Serving on standards committee	0.41	0.00	0.20	0.00	37%	
Serving on curriculum committee	0.79	0.00	0.20	0.00	295%	
Managing information technology	8.05	5.00	7.94	6.00	1%	-17%
Total	**34.56**	**26.00**	**27.07**	**21.00**	**28%**	**24%**

Table 14. Comparison of Highest and Lowest Scoring Schools on Key School Library Predictors of 11th Grade PSSA Reading Scores, 1998/99

11th Grade PSSA Reading Scores & Predictors	25 Highest Scoring Schools		25 Lowest Scoring Schools		Percent Difference (lowest to highest)	
	Mean	Median	Mean	Median	Mean	Median
PSSA Reading Scores (100 point scale)	86.75	86.25	74.73	75.00	16%	15%
School Library Expenditures						
(from school budget)	23,730	22.000	14,197	9,050	67%	143%
School Librarian / with Support Staff						
Weekly Librarian hours	45.06	40.00	43.25	40.00	4%	0%
Weekly support staff hours	49.57	40.00	19.28	17.50	157%	129%
Information Resources						
Print volumes	15,474	14,803	14,499	12,500	7%	18%
Periodical subscriptions	75.40	77.00	68.00	62.00	11%	24%
CD-ROM reference titles	9.90	4.50	8.87	4.00	12%	13%
Total	**17,082**	**16,095**	**14,861**	**13,308**	**15%**	**21%**
Information Technology						
Library/networked computers	**111.28**	**25.50**	**75.57**	**20.00**	**47%**	**28%**
with licensed database access	96.88	10.00	43.23	6.00	124%	67%
with Internet access	112.00	14.00	51.09	13.50	119%	4%
with ACCESS PENNSYLVANIA	94.35	10.00	53.86	8.00	75%	25%
Integrating Information Literacy						
Weekly hours spent						
Teaching cooperatively w/classroom teachers	10.26	4.50	7.55	5.00	36%	-10%
Providing info instruction to individuals or groups	13.89	10.00	12.26	10.00	13%	0%
Providing in-service training to teachers	2.20	0.50	0.55	0.00	300%	
Serving on standards committee	0.80	0.00	0.27	0.00	197%	
Serving on curriculum committee	0.36	0.00	0.25	0.00	46%	
Managing information technology	11.73	7.75	6.88	5.00	70%	55%
Total	**41.08**	**31.00**	**29.07**	**26.00**	**41%**	**19%**

Conclusions

Pennsylvania School Library Programs Can Make A Difference Supporting The Efforts Of Schools To Measure Up To Standards. Pennsylvania System of School Assessment (PSSA) reading scores increase with increases in the following characteristics of school library information programs: staffing, information technology, and integration of information literacy into the curriculum. In addition, as staffing, information resources, and information technology rise, school library staff spend more time teaching students and teachers how to access and use information resources. The relationship between staffing and test scores is not explained away by other school or community conditions. (See Figure 1, p. 9.)

Staffing

PSSA reading scores increase with increases in:

- school librarian staff hours; and
- support staff hours.

Information Technology

Where networked computers link school libraries with classrooms, labs, and other instructional sites, students earn higher PSSA reading test scores. These higher scores are particularly linked to the numbers of computers enabling teachers and students to utilize:

- the ACCESS PENNSYLVANIA database;
- licensed databases; and
- Internet/World Wide Web.

Integrating Information Literacy

Information Literate Students Know How To Use Information And Ideas Effectively.

The “keystone” finding of this study is the importance of an integrated approach to information literacy. For school library programs to be successful agents of academic achievement, information literacy must be an integral part of the school’s approach to both standards and curriculum.

Test scores increase as school librarians spend more time:

- teaching cooperatively with teachers;
- teaching information literacy independently;
- providing in-service training to teachers;
- serving on standards committee;
- serving on curriculum committee; and
- managing information technology.

Indirect Effects

In addition to its direct effect on academic achievement, higher levels of school library program staffing—especially certified school librarians—predict:

- higher expenditures;
- larger and more varied collections of information resources;
- increased access to information technology for teachers and students; and
- more integrated approaches to information literacy, standards, and curriculum.

The more print and electronic information resources available through the school library, the greater amount of time spent by the school librarian on information literacy—that is, teaching students and teachers how to access and use such resources.

School and Community Differences

These predictors of academic achievement cannot be explained away by:

- school differences, including:
  - school expenditures per pupil;
  - teacher characteristics (education, experience, salaries);
  - teacher/pupil ratio; and
  - student characteristics (poverty, race/ethnicity), or
- community differences, such as:
  - adult educational attainment;
  - families in poverty; and
  - racial/ethnic demographics.

How Much Can Scores Rise With Good School Library Programs?

How much will a school's test scores improve with specific improvements in its library program? The answer depends on the school library program's current status, what it improves, and how much it is improved. When all school library predictors are maximized (e.g., staffing, library expenditures, information resources and technology, and information literacy activities of staff), PSSA reading scores tend to run 10 to 15 points higher.

TALES FROM THE TRENCHES

Teamwork Pays Off

We offer a flex in-service to teachers called G.R.O.W. - Graduate Research On the Web. Teachers learn Internet search strategies and databases that provide just the information they desire.

This personalized research assistance service engenders a lot of goodwill. Teachers realize that we can teach them how to get and analyze information. Together the teacher and librarian teach the curriculum objective. Teachers often say to students when faced with a need for information: "Have you asked the librarian, have you been to the library, have you tried the Internet?"

Lois McNicol, Librarian
Garnet Valley High School
Glen Mills

Spreading the Word

When there is additional access to information technology, I immediately update my lesson plans for students and publicize the new resources among the faculty. I do this through in-service sessions, faculty meeting presentations, library signs, and lots of handouts. I distributed a chart of all the databases and multi-media resources available on our network with instructions on how to access them anywhere in the building (or from home, if applicable, like ACCESS PA).

I also publicized that our county public libraries have made parts of the POWER Library available to all library card holders. Students are very excited about this. One teacher said she was pleased to be able to share the home access information with a teacher in a neighboring (much wealthier) district who had not heard about it and was excited about the new convenience.

Allison Hutchison, Librarian
Bald Eagle Area High School
Wingate

Outside the Box

If Hakim reads on a 6th grade level, Helen at the 4th grade, and the text-book is on an 8th grade level, are they going to learn using that book? Will it raise their achievement or their level of frustration? If the teacher gathers material about the Civil War in all different formats, at all different levels, with videos, web sites with primary source materials, and computer simulations to experience, students are more likely to learn.

Teachers who used library materials this way stopped using textbooks and supported learning with library resources instead. When standardized test scores were published, teachers whose students used the library and its resources, had higher classroom averages on the tests.

Debra Lyman Gniewek
Library Programs and Services
Philadelphia School District

Recommendations for Action

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

- School library programs 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.

- **School librarians** must assert themselves as **leaders** in their schools. It is their responsibility to take the initiative required for **information literacy** to become an **integral part of the schools' approaches to both standards and curriculum**.

- Principals can do much to make this possible, including adopting **policies and practices** and communicating **expectations** that encourage **school librarians** to act as professional educators and **classroom teachers** to accept them as **colleagues**.

- The school library program cannot be limited to the library 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** (such as available through the POWER Library project) from which current, authoritative information may be obtained.

Appendices

Bibliography

List of Participants

Survey of School Libraries in Pennsylvania 1999

Measuring Up to Standards: The Impact of School Library Programs and Information Literacy in Pennsylvania Schools (brochure)

Proof of the Power: A First Look at the Colorado Study … and More!

- **FAST FACTS**
- **PowerPoint Slides**

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List of Participants

School Name	City
ACMETONIA PRIMARY SCH	CHESWICK
ALBERT GALLATIN AREA SHS	UNIONTOWN
ALDAN SCH	ALDAN
ALLEGHENY VALLEY EL SCH	CLARENDON
ALLEGHENY-CLARION VALLEY HS	FOXBURG
ALLEN MS	CAMP HILL
ALTOONA AREA HS	ALTOONA
AMBRIDGE AREA JHS	FREEDOM
AMY NW	PHILADELPHIA
ANNVILLE CLEONA JSHS	ANNVILLE
ANTIETAM JSHS	READING
ARDMORE AVENUE SCH	LANSDOWNE
ARLINGTON HEIGHTS EL SCH	STROUDSBURG
ARMAGH TWP EL SCH	MILROY
ARROWHEAD EL SCH	COLLEGEVILLE
B F MOREY EL SCH	STROUDSBURG
BALD EAGLE AREA JSHS	WINGATE
BANGOR AREA MS	BANGOR
BANGOR AREA SHS	BANGOR
BEAVER AREA MS	BEAVER
BELLE VERNON AREA HS	BELLE VERNON
BELLMAR MS	BELLE VERNON
BELLWOOD ANTIS HS	BELLWOOD
BENTON AREA JSHS	BENTON
BENTWORTH SHS	BENTLEYVILLE
BERGSTRASSE EL SCH	EPHRATA
BERLIN BROTHERSVALLEY JSHS	BERLIN
BERMUDIAN SPRINGS HS	YORK SPRINGS
BERWICK AREA HS	BERWICK
BIGLERVILLE HS	BIGLERVILLE
BLACKHAWK HS	BEAVER FALLS
BLOOMSBURG AREA HS	BLOOMSBURG
BLUE MOUNTAIN HS	SCHUYLKILL HAVEN
BLUE MOUNTAIN MS	ORWIGSBURG
BLUE RIDGE HS	NEW MILFORD
BORLAND MANOR EL SCH	CANONSBURG
BRADFORD AREA HS	BRADFORD
BRADFORD HGTS EL SCH	DOWNINGTOWN
BRANDYWINE HEIGHTS HS	TOPTON
BRENTWOOD SHS	PITTSBURGH
BRIDGEPORT EL SCH	BRIDGEPORT
BRISTOL JSHS	BRISTOL
BROWN TWP EL SCH	REEDSVILLE
BROWNSVILLE AREA HS	BROWNSVILLE

School Name	City
BURCHFIELD EL SCH	ALLISON PARK
BURGETTSTOWN EL CTR	BURGETTSTOWN
BUTLER AREA JHS	BUTLER
BUTLER AREA SHS	BUTLER
CALN EL SCH	THORNDALE
CAMBRIA HEIGHTS MS	HASTINGS
CAMBRIA HEIGHTS SHS	PATTON
CAMP HILL SHS	CAMP HILL
CANON-MCMILLAN SHS	CANONSBURG
CANONSBURG MS	CANONSBURG
CANTON JSHS	CANTON
CARLYNTON JSHS	CARNEGIE
CARSON MS	PITTSBURGH
CATASAUQUA SHS	CATASAUQUA
CECIL EL SCH	CECIL
CECIL MS	MCDONALD
CEDAR CLIFF HS	CAMP HILL
CEDAR CREST HS	LEBANON
CENTER AREA JHS	MONACA
CENTRAL DAUPHIN SHS	HARRISBURG
CENTRAL EL SCH	SOUTH WILLIAMSPORT
CENTRAL HS	ERIE
CENTRAL YORK HS	YORK
CENTRAL YORK MS	YORK
CHANCELLOR STREET EL SCH	NEWTOWN
CHARLEROI AREA HS	CHARLEROI
CHELTENHAM HS	WYNCOTE
CHESTNUT RIDGE MS	FISHERTOWN
CHESTNUT RIDGE SHS	NEW PARIS
CHURCHVILLE EL SCH	CHURCHVILLE
CLARION AREA EL SCH	CLARION
CLARION AREA JSHS	CLARION
CLARION-LIMESTONE AREA JSHS	STRATTANVILLE
COCHRANTON JSHS	COCHRANTON
COLONIAL EL SCH	PLYMOUTH MEETING
COLONIAL MS	NORRISTOWN
COLUMBIA JSHS	COLUMBIA
COMMODORE PERRY SCH	HADLEY
CONEMAUGH TWP AREA JSHS	DAVIDSVILLE
CONNEAUT LAKE HS	CONNEAUT LAKE
CONNELLSVILLE JHS WEST	CONNELLSVILLE
CONRAD WEISER JSHS	ROBESONIA
CONSHOHOCKEN EL SCH	CONSHOHOCKEN
CORRY AREA MS/HS	CORRY
COUDERSPORT AREA EL SCH	COUDERSPORT

School Name	City
COUNCIL ROCK JHS-HOLLAND	HOLLAND
COUNCIL ROCK JHS-NEWTOWN	NEWTOWN
COUNCIL ROCK JHS-RICHBORO	RICHBORO
COUNCIL ROCK SHS	NEWTOWN
CRANBERRY EL SCH	SENECA
CRESTWOOD HS	MOUNTAINTOP
CROSSROADS MS	LEWISBERRY
CURWENSVILLE AREA JSHS	CURWENSVILLE
DAMASCUS AREA SCH	DAMASCUS
DANVILLE AREA MS	DANVILLE
DANVILLE AREA SHS	DANVILLE
DELAHUNTY MS	HERMITAGE
DERRY AREA SHS	DERRY
DILLSBURG EL SCH	DILLSBURG
DOBSON JAMES SCH	PHILADELPHIA
DOMENICK DEFRANCO EL SCH	BANGOR
DOWNINGTON MS	DOWNINGTON
DUBOIS AREA SHS	DUBOIS
EAGLE VIEW MS	MECHANICSBURG
EAST FOREST JSHS	MARIENVILLE
EAST JUNIATA JSHS	COCOLAMUS
EAST PENNSBORO AREA MS	ENOLA
EASTERN LEBANON CO SHS	MYERSTOWN
EBENEZER EL SCH	LEBANON
EDGEWORTH EL SCH	SEWICKLEY
EISENHOWER MS/HS	RUSSELL
ELDERTON EL SCH	ELDERTON
ELDRED EL SCH	KUNKLETOWN
EPHRATA MS	EPHRATA
EPHRATA SHS	EPHRATA
EVERETT AREA JSHS	EVERETT
FAIRVIEW AVENUE EL SCH	WAYNESBORO
FANNETT-METAL EL SCH	WILLOW HILL
FANNETT-METAL MS	WILLOW HILLS
FANNETT-METAL SHS	WILLOW HILL
FAUST JHS	CHAMBERSBURG
FERNDALE AREA JSHS	JOHNSTOWN
FIRST STREET EL SCH	CANONSBURG
FLEETWOOD SHS	FLEETWOOD
FORBES ROAD JSHS	WATERFALL
FOREST HILLS EL SCH	SIDMAN
FORT CHERRY EL CTR	MCDONALD
FORT ZELLER EL SCH	RICHLAND
FRANKLIN EL SCH	SEWICKLEY
FRED S ENGLE MS	WEST GROVE

School Name	City
GALETON AREA SCH	GALETON
GARNET VALLEY EL SCH	GLEN MILLS
GARNET VALLEY HS	GLEN MILLS
GARNET VALLEY MS	GLEN MILLS
GARWOOD MS	FAIRVIEW
GENERAL MCLANE HS	EDINBORO
GENERAL WAYNE MS	MALVERN
GLENOLDEN SCH	GLENOLDEN
GOODNOE EL SCH	NEWTOWN
GREENVILLE JSHS	GREENVILLE
HALLOWELL EL SCH	HORSHAM
HAMILTON ANDREW SCH	PHILADELPHIA
HAMILTON TWP EL SCH	SCIOTA
HAMPTON HS	ALLISON PARK
HANOVER AREA JSHS	WILKES-BARRE
HANOVER MS	HANOVER
HARDING EL SCH	ERIE
HARMONY AREA HS	WESTOVER
HARRISON MS	PITTSBURGH
HASSON HEIGHTS SCH	OIL CITY
HATBORO-HORSHAM SHS	HORSHAM
HENDERSON SHS	WEST CHESTER
HERSHEY MS	HERSHEY
HIGHCLIFF EL SCH	PITTSBURGH
HIGHLAND PARK AREA EL SCH	LEWISTOWN
HIGHLANDS MS	NATRONA HEIGHTS
HIGHLANDS SHS	NATRONA HEIGHTS
HILL J E/FREEDMAN SAMSON	PHILADELPHIA
HILLS-HENDERSONVILLE EL SCH	CANONSBURG
HOLLAND EL SCH	HOLLAND
HOLLIDAYSBURG AREA JHS	HOLLIDAYSBURG
HOME STREET EL SCH	WARREN
HOMER-CENTER EL SCH	HOMER CITY
HOOVER EL SCH	LANGHORNE
HOPEWELL JHS	ALIQUIPPA
HOUCK EL SCH	LEBANON
HOUSERVILLE/LEMONT EL SCH	STATE COLLEGE
INDIAN VALLEY MS	REEDSVILLE
INGOMAR EL SCH	PITTSBURGH
INTERBORO SHS	PROSPECT PARK
IROQUOIS JSHS	ERIE
J R FUGETT MS	WEST CHESTER
J T LAMBERT INTERMEDIATE SCH	EAST STROUDSBURG
JACKSON SCH	YORK
JAMES BUCHANAN SHS	MERCERSBURG

School Name	City
JEANNETTE MCKEE EL/MS	JEANNETTE
JEFFERSON EL SCH	WARREN
JEFFERSON-MORGAN JSHS	JEFFERSON
JENKINTOWN JSHS	JENKINTOWN
JENKS JOHN S SCH	PHILADELPHIA
JERSEY SHORE AREA SHS	JERSEY SHORE
JIM THORPE AREA SHS	JIM THORPE
JOSEPH E FERDERBAR EL SCH	FEASTERVILLE
JUNIATA VALLEY JSHS	ALEXANDRIA
KEITH VALLEY MS	HORSHAM
KENNETT MS	KENNETT SQUARE
KENSINGTON HS	PHILADELPHIA
KERNSVILLE SCH	OREFIELD
KEYSTONE JSHS	KNOX
KEYSTONE OAKS MS	PITTSBURGH
KISKI AREA IHS	VANDERGRIFT
KITTANNING SHS	KITTANNING
KNOCH HS	SAXONBURG
KUTZTOWN AREA SHS	KUTZTOWN
L B MORRIS EL SCH	JIM THORPE
LACKAWANNA TRAIL JSHS	FACTORYVILLE
LANDISVILLE INTRMD CTR	LANDISVILLE
LANGLEY HS	PITTSBURGH
LAUREL JSHS	NEW CASTLE
LAWRENCE PARK EL SCH	ERIE
LEBANON SHS	LEBANON
LEECHBURG AREA HS	LEECHBURG
LEOLA EL SCH	LEOLA
LIBERTY JSHS	LIBERTY
LINCOLN SCH	YORK
LINCOLN-JACKSON #14	SCRANTON
LINE MOUNTAIN HS	HERNDON
LINGLESTOWN EL SCH	HARRISBURG
LIONVILLE MS	EXTON
LITITZ EL SCH	LITITZ
LITTLESTOWN SHS	LITTLESTOWN
LOCK HAVEN JSHS	LOCK HAVEN
LOWER DAUPHIN SHS	HUMMELSTOWN
LOYALSOCK TWP SHS	WILLIAMSPORT
MAHANOY AREA HS	MAHANOY CITY
MAHANOY AREA MS	MAHANOY CITY
MANHEIM CENTRAL SHS	MANHEIM
MANHEIM TWP HS	LANCASTER
MAPLE AVENUE MS	LITTLESTOWN
MAPLE POINT MS	LANGHORNE

School Name	City
MAPLEWOOD HS	GUYS MILLS
MARKET STREET EL SCH	WARREN
MARKLEY EL SCH	MALVERN
MARS AREA MS	MARS
MARS AREA SHS	MARS
MARSHALL EL SCH	WEXFORD
MARTIN MEYLIN MS	LAMPETER
MCCLURE MS	MCKEESPORT
MCINTYRE EL SCH	PITTSBURGH
MEADVILLE AREA SHS	MEADVILLE
MERCER AREA JSHS	MERCER
MIDDLEBURG JSHS	MIDDLEBURG
MIFFLIN THOMAS SCH	PHILADELPHIA
MILLER MS	WAYNESBURG
MILLERSBURG AREA MS	MILLERSBURG
MILTON HS	MILTON
MOHAWK EL SCH	BESSEMER
MOHAWK JSHS	BESSEMER
MONTGOMERY AVENUE EL SCH	WEST PITTSTON
MONTROSE AREA JSHS	MONTROSE
MOON MS	CORAOPOLIS
MOON SHS	CORAOPOLIS
MOUNT CARMEL AREA JSHS	MOUNT CARMEL
MOUNT PLEASANT AREA JSHS	MOUNT PLEASANT
MOUNT UNION AREA JSHS	MOUNT UNION
MUHLENBERG HS	LAURELDALE
MUNCY JSHS	MUNCY
MURRAY AVENUE EL SCH	HUNTINGDON VALLEY
MUSE EL SCH	MUSE
NANCY GRAYSON EL SCH	SHIPPENSBURG
NESHANNOCK JSHS	NEW CASTLE
NEW BRIGHTON AREA EL SCH	NEW BRIGHTON
NEW BRIGHTON AREA HS	NEW BRIGHTON
NEW CUMBERLAND MS	NEW CUMBERLAND
NEW HOPE-SOLEBURY HS	NEW HOPE
NEW OXFORD EL SCH	NEW OXFORD
NEW OXFORD SHS	NEW OXFORD
NEWPORT EL SCH	NEWPORT
NEWPORT SHS	NEWPORT
NEWTOWN EL SCH	NEWTOWN
NORTH CLARION CO JSHS	TIONESTA
NORTH DICKINSON EL SCH	CARLISLE
NORTH HILLS JHS	PITTSBURGH
NORTH HILLS SHS	PITTSBURGH
NORTH POCONO HS	MOSCOW

School Name	City
NORTH SCHUYLKILL JSHS	ASHLAND
NORTH STAR EAST MS	KANTNER
NORTH STAR HS	BOSWELL
NORTH WARREN EL SCH	NORTH WARREN
NORTHERN BEDFORD CO MS/SHS	LOYSBURG
NORTHERN CAMBRIA HS	BARNESBORO
NORTHERN HS	DILLSBURG
NORTHERN LEHIGH SHS	SLATINGTON
NORTHERN MS	DILLSBURG
NORTHERN POTTER JSHS	ULYSSES
NORTHGATE JSHS	PITTSBURGH
NORTHWAY EL SCH	PITTSBURGH
NORTHWEST EL SCH	LEBANON
NORWIN MS WEST	NORTH HUNTINGDON
NORWIN SHS	NORTH HUNTINGDON
NORWOOD SCH	NORWOOD
OIL CITY SHS	OIL CITY
OLEY VALLEY EL SCH	OLEY
OSBORNE EL SCH	SEWICKLEY
OVERBROOK EDU CTR	PHILADELPHIA
PALISADES HS	KINTNERSVILLE
PALISADES MS	KINTNERSVILLE
PARK EL SCH	MUNHALL
PAXTONIA EL SCH	HARRISBURG
PENN TRAFFORD HS	HARRISON CITY
PENN WOOD WEST JHS	DARBY
PENN-CAMBRIA HS	CRESSON
PENNS VALLEY AREA JSHS	SPRING MILLS
PENNSBURY SHS	FAIRLESS HILLS
PERKIOMEN VALLEY MS	TRAPPE
PERRYSVILLE EL SCH	PITTSBURGH
PHILIPSBURG-OSCEOLA AREA HS	PHILIPSBURG
PHOENIXVILLE AREA HS	PHOENIXVILLE
PINE GROVE AREA HS	PINE GROVE
PITTSFIELD EL SCH	PITTSFIELD
PLEASANT TOWNSHIP EL SCH	WARREN
PLEASANT VALLEY EL SCH	KUNKLETOWN
PLYMOUTH EL SCH	PLYMOUTH MEETING
PLYMOUTH-WHITEMARSH SHS	PLYMOUTH MEETING
POCONO MTN EL SCH N CPM	TOBYHANNA
POLK EL SCH	KRESGEVILLE
POTTSTOWN SHS	POTTSTOWN
PRESTON SCH	LAKEWOOD
PROSPECT PARK SCH	PROSPECT PARK
QUAKER VALLEY HS	LEETSDALE

School Name	City
QUAKER VALLEY MS	SEWICKLEY
RADIO PARK EL SCH	STATE COLLEGE
RADNOR MS	WAYNE
RANKIN INTRMD SCH	RANKIN
READING SHS	READING
RED LAND SHS	LEWISBERRY
REYNOLDS JSHS	GREENVILLE
RICHBORO EL SCH	RICHBORO
RICHLAND EL SCH	QUAKERTOWN
RICHLAND SHS	JOHNSTOWN
RIDGE PARK EL SCH	CONSHOHOCKEN
RIDGWAY AREA HS	RIDGWAY
RINGGOLD SHS	MONONGAHELA
RIVERSIDE MS	ELLWOOD CITY
ROBESON EL CTR	BIRDSBORO
ROCKY GROVE JSHS	FRANKLIN
ROLLING ACRES EL SCH	LITTLESTOWN
ROSS EL SCH	PITTSBURGH
ROSTRAVER MS	BELLE VERNON
SAEGERTOWN EL SCH	SAEGERTOWN
SARA J DYMOND EL SCH	HARDING
SCANDIA EL SCH	RUSSELL
SCHOOL STREET EAST	BRADFORD
SCHUYLKILL HAVEN MS	SCHUYLKILL HAVEN
SCHUYLKILL HAVEN SHS	SCHUYLKILL HAVEN
SCHUYLKILL VALLEY EL SCH	LEESPORT
SCHUYLKILL VALLEY HS	LEESPORT
SELINSGROVE AREA MS	SELINSGROVE
SEVILLE EL SCH	PITTSBURGH
SHAMOKIN AREA JSHS	COAL TOWNSHIP
SHARPSVILLE AREA SHS	SHARPSVILLE
SHEFFIELD EL SCH	SHEFFIELD
SHEFFIELD MS/HS	SHEFFIELD
SHENANDOAH VALLEY JSHS	SHENANDOAH
SHOEMAKER WM H MS	PHILADELPHIA
SIMMONS EL SCH	HORSHAM PA
SLIPPERY ROCK AREA HS	SLIPPERY ROCK
SMETHPORT AREA JSHS	SMETHPORT
SMOKETOWN EL SCH	LANCASTER
SOMERSET AREA SHS	SOMERSET
SOUTH CENTRAL EL	CANONSBURG
SOUTH STREET EL SCH	WARREN
SOUTHEAST EL SCH	LEBANON
SOUTHERN LEHIGH SHS	CENTER VALLEY
SOUTHWEST EL SCH	LEBANON

School Name	City
SPRING GROVE AREA MS	SPRING GROVE
SPRING GROVE AREA SHS	SPRING GROVE
SPRINGFIELD EL SCH	QUAKERTOWN
SPRINGFIELD TWP HS	ERDENHEIM
SPRINGHOUSE JHS	ALLENTOWN
STATE COLLEGE AREA HS	STATE COLLEGE
STEELTON-HIGHSPIRE HS	STEELTON
STRODES MILLS MS	MCVEYTOWN
STROUDSBURG HS	STROUDSBURG
SULLIVAN CO JSHS	LAPORTE
SUSQUEHANNOCK HS	GLEN ROCK
TAMAQUA AREA SHS	TAMAQUA
TIDIOUTE AREA SCH	TIDIOUTE
TINICUM EL SCH	PIPERSVILLE
TINICUM SCH	ESSINGTON
TITUSVILLE JHS	TITUSVILLE
TITUSVILLE SHS	TITUSVILLE
TOHICKON VALLEY EL SCH	QUAKERTOWN
TRINITY EAST EL SCH	WASHINGTON
TRINITY NORTH EL SCH	WASHINGTON
TRI-VALLEY JSHS	HEGINS
TROY AREA SHS	TROY
TULPEHOCKEN HS	BERNVILLE
TURKEYFOOT VALLEY AREA JSHS	CONFLUENCE
TWIN VALLEY MS	ELVERSON
UNION CITY HS	UNION CITY
UNION TWP EL SCH	BELLEVILLE
UNIONVILLE HS	KENNETT SQUARE
UNITED JSHS	ARMAGH
UPPER DARBY SHS	UPPER DARBY
UPPER DAUPHIN AREA HS	ELIZABETHVILLE
UPPER MERION MS	KING OF PRUSSIA
UPPER PERKIOMEN HS	PENNSBURG
UPPER PERKIOMEN MS	EAST GREENVILLE
UPPER SAINT CLAIR HS	PITTSBURGH
VALLEY FORGE MS	WAYNE
VALLEY SHS	NEW KENSINGTON
VALLEY VIEW HS	ARCHBALD
WALLENPAUPACK AREA MS	HAWLEY
WARREN AREA HS	WARREN
WARREN CO AVTS	WARREN
WARWICK EL SCH	JAMISON
WASHINGTON EL SCH	PITTSBURGH
WASHINGTON MARTHA SCH	PHILADELPHIA
WAYNESBURG CENTRAL EL SCHOOL	WAYNESBURG

School Name	City
WAYNESBURG CENTRAL HS	WAYNESBURG
WEATHERLY AREA SHS	WEATHERLY
WEIGELSTOWN EL SCH	DOVER
WELLSBORO AREA HS	WELLSBORO
WESLEYVILLE EL SCH	ERIE
WEST ALLEGHENY SHS	IMPERIAL
WEST HEMPFIELD MS	IRWIN
WEST MIDDLESEX JSHS	WEST MIDDLESEX
WEST SNYDER JSHS	BEAVER SPRINGS
WEST VIEW EL SCH	PITTSBURGH
WEST YORK AREA SHS	YORK
WESTERN BEAVER CO JSHS	INDUSTRY
WESTMONT HILLTOP HS	JOHNSTOWN
WHITEHALL HS	WHITEHALL
WHITEMARSH EL SCH	LAFAYETTE HILL
WILLIAMS VALLEY JSHS	TOWER CITY
WILLIAMSBURG COMMUNITY JSHS	WILLIAMSBURG
WILMINGTON AREA HS	NEW WILMINGTON
WILSON AREA HS	EASTON
WILSON EL SCH	IMPERIAL
WILSON MS	CARLISLE
WOODLAND HILLS JHS-EAST	TURTLE CREEK
WOODLAND HILLS SHS	PITTSBURGH
WRIGHTSTOWN EL SCH	WRIGHTSTOWN
WYLANDVILLE EL SCH	EIGHTY FOUR
WYOMING VALLEY WEST MS	KINGSTON
WYOMISSING AREA JSHS	WYOMISSING
YORK SUBURBAN SHS	YORK
YOUGH SHS	HERMINIE
YOUNGSVILLE EL SCH	YOUNGSVILLE
YOUNGSVILLE MS/HS	YOUNGSVILLE

Direct questions to:

Keith Curry Lance
Email: klance@sni.net
voice 303/866-6900 - fax 303/866-6940

SAMPLE QUESTIONNAIRE
Do Not Complete or Return

DUE DATE: XXX XX, 1999

Return the completed questionnaire in the accompanying postage-paid envelope or address your own envelope to: PA SL SURVEY - Louise Conner, Library Research Service, XXX E. XXXXXX Ave., Denver, CO XXXXX-1799.

Extra copies of this questionnaire are available at http://www.lrs.org. Click on Special Projects under ABOUT LRS and scroll to The Impact of Pennsylvania School Libraries on Academic Achievement.

PART I - RESPONDENT INFORMATION

Please identify your school by name, level, and district and provide contact information 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		
Grades in School (circle all that apply) preK K 1 2 3 4 5 6 7 8 9 10 11 12		
District Name	Intermediate Unit	
School Address		
City	County	Zip code
Name of Respondent	Title	
Phone ( )	Fax ( )	E-mail:

PART II - SERVICE HOURS PER TYPICAL WEEK

Please report the typical weekly number of hours this school library is open for use. Report hours during school, before and after school hours, and during the summer.

Item	*Line*	*Hours per Typical Week*
Hours open per typical school week during school hours	1	
Hours open per typical school week before school hours	2	
Hours open per typical school week after school hours	3	
Hours open per typical summer week	4	

PART III - SCHOOL LIBRARY STAFFING PER TYPICAL WEEK

Please report the level of staffing for this school library program—first by education and selected other credentials, then by classification. Include both the number of persons in each type of position and the total number of person-hours per typical week for each staff type (i.e., the sum of the typical weekly hours for staff of each type). Do not report more than 40 hours per week per person in each table. Count each individual only once per table. (Optional items regarding extra hours appear later in this questionnaire.)

Example: If two persons are reported as other paid staff on line III 4 (a) and one works 20 hours per week and the other 10, enter 30 on line III 4 (b).

Paid Staff by Education and Selected Other Credentials	*Line*	*Number of Persons (head count, not FTE) (a)*	*Total Person-Hours per Typical Week (b)*
Master's degree or higher --with teacher & library science certification	1		
--with teacher certification only	2		
--with teacher certification and/or other state credential(s)--specify:	3		
--with neither teacher certification nor other state credentials	4		
Bachelor's degree --with teacher & library science certification	5		
--with teacher certification only	6		
--with teacher certification and/or other state credential(s)--specify:	7		
--with neither teacher certification nor other state credentials	8		
Less than Bachelor's degree	9		
TOTAL PAID STAFF (Sum of lines III 1-9)	**10**		

SAMPLE QUESTIONNAIRE – *Do Not Complete or Return*

Volunteer Type	*Line*	*Number of Persons (head count, not FTE) (a)*	*Total Person-Hours per Typical Week (b)*
Adult volunteers	11		
Student workers	12		
TOTAL VOLUNTEER WORKERS (Sum of lines III 11-12)	**13**		

PART IV – SELECTED PAID STAFF ACTIVITIES PER TYPICAL WEEK

Library staff engage in a wide variety of activities each week. Some of these activities are completed during regular business hours, but others are only completed because staff agree or volunteer to work extra hours. For each of the following activities, please report (estimating, if necessary) the number of hours per typical week spent on each activity. NOTE: The "non-contract" column is optional. If "non-contract" (i.e., extra) hours are not put in on a weekly basis, please estimate for a month and divide by four or estimate for a year and divide by the number of weeks per year the library is open.

SAMPLE QUESTIONNAIRE *Do Not Complete or Return* *Selected Activities*	*Person-Hours Per Typical Week* *Line*	*Con-tract Hours (a)*	*OPTIONAL Non-contract Hours (b)*
Learning & Teaching Hours spent weekly planning instructional units with teachers	1		
Hours spent weekly teaching cooperatively with teachers	2		
Hours spent weekly providing in-service training to teachers and/or other school staff	3		
Hours spent weekly meeting with building or district standards committees/teams/task forces	4		
Hours spent weekly serving on building or district curriculum committees	5		
Hours spent weekly assisting teachers (individually or in groups) in accessing and/or utilizing standards-related information	6		
Information Access & Delivery Hours spent weekly identifying materials for instructional units developed by teachers	7		
Hours spent weekly providing information skills instruction to individuals or groups (e.g., citations, copyright/plagiarism, critical thinking, evaluating Internet sources, note-taking)	8		
Hours spent weekly offering reading incentive activities (e.g., reader's advisory services, book talks, story times, author visits, puppet shows)	9		
Hours spent weekly performing basic library functions (e.g., processing, retrieving, checking in and out, re-shelving/re-storing materials/equipment)	10		
Program Administration Hours spent weekly managing computers/library automation/computer network	11		
Hours spent weekly in meetings of building and/or district school library staff	12		
Hours spent weekly meeting with other school library staff from beyond your own building and district	13		
Hours spent weekly meeting with principal and/or other building or district administrators	14		
Hours spent weekly attending general faculty and/or staff meetings	15		
Extra duties unrelated to school library services (e.g., monitoring restrooms, lunch, buses, recess, etc.)	16		
All other paid staff hours weekly	17		
TOTAL PAID STAFF HOURS (Sum of lines IV 1-17) **Note: IV 18 (a) must equal III-10 (b): Total Person-Hours Per Typical Week for All Paid Staff**	**18**		

PART V - SCHOOL LIBRARY USAGE PER TYPICAL WEEK

Please report the following types of usage of the school library program per typical week. If these figures must be estimated 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	*Line*	*Number*
Visits to the school library (scheduled or unscheduled) by ■ Individuals (students, teachers, administrators, parents, others)	1a	
■ Classes or other groups (e.g., groups of teachers, administrators, parents, or other school visitors)	1b	
Information skills instruction contacts (scheduled or unscheduled) ■ Individuals (students, teachers, administrators, parents, others)	2a	
■ Classes or other groups (e.g., groups of teachers, administrators, parents, or other school visitors)	2b	
Circulation of materials (include all formats)	3	
In-library use of materials (estimate based on reshelving count)	4	
Intra-district loans (i.e., loans of materials between one building and another within the same school district, including items obtained from district collections) ■ Items provided to other buildings ■ Items received from other buildings and district collections	 5a 5b	 _____ _____
ACCESS PA loans (i.e., loans of materials between this school library and other libraries of any type outside its school district and items obtained from document delivery services) ■ Items provided to other buildings ■ Items received from other buildings	 6a 6b	 _____ _____

SAMPLE QUESTIONNAIRE – *Do Not Complete or Return*

PART VI – SCHOOL LIBRARY TECHNOLOGY

Please report the total number of computers located in the school library as well as the number of those computers with each of the following features. For the total as well as each following category, distinguish the number of computers in your school that are located in or under the supervision of the school library and others from which networked library resources may be accessed. Do not include non-library computers from which networked library resources cannot be accessed. For this question, the terms "computer," "terminal," and "workstation" are considered synonymous. Computers under the supervision of the school library (e.g., in a separate computer lab) but not located in the same immediate space may be counted in column (a). Computers from which any networked school library resources may be accessed may be located in classrooms, a separately administered computer lab, mini-lab, administrative offices, or any other school space not under the supervision of the school library. Any particular computer should be counted only once in item VI 1a, but may be counted more than once in items VI 1b through VI 1n.

Number of computers	*Line*	***Number of computers in school***	
		Located in or under super-vision of school library (a)	*From which any networked library resources may be accessed (b)*
TOTAL	1a		
Number of these … ■ With Internet connection	1b		
■ On a local area network (LAN)	1c		
■ On a wide area network (WAN)	1d		
■ With access to the school library catalog	1e		
■ With access to school library databases (e.g., FirstSearch, SIRS)	1f		
■ With a menu option or bookmark for ACCESS PA	1g		
■ With CD ROM drives	1h		
■ With networked access to CD ROM resources	1i		
■ That can display text only	1j		
■ That can display graphics (World Wide Web)	1k		
■ Connected to a modem or equivalent	1l		
■ Connected directly to or networked to a printer	1m		
■ With <u>any</u> accommodations for persons with disabilities (e.g., voice synthesizer, magnified screen)	1n		

For the total number of school library computers reported in VI 1a, identify the number of each of the following types:

Number of personal computers by processor speed	*Line*	*Number of PCs*	*Number of Macintosh microcomputers running*	*Line*	*Number of MACs*
Pentium or higher	2a		PowerMac or later	3a	
486	2b		System 7	3b	
386 or lower	2c		System 6 or earlier	3c	

SAMPLE QUESTIONNAIRE – *Do Not Complete or Return*

PART VI – SCHOOL LIBRARY TECHNOLOGY--continued

Considering all of the computers reported in VI 1a, mark the fastest Internet service connection speed available on any computer. Mark (X) one.

Maximum speed of Internet service connection					
Speed	*Line*	*Dial-Up*	*Speed*	*Line*	*Dedicated Line*
None	4a	☐	56k (via dedicated line)	4e	☐
14.4K or less	4b	☐	ISDN	4f	☐
28.8K	4c	☐	T-1	4g	☐
56K (via dial-up)	4d	☐	Other (frame relay, ADSL)	4h	☐

The following items seek a description of Internet access conditions and filtering practices affecting school library computers. Mark all that apply to the left. Mark one for each question to the right.

Internet access for students					
Conditions of Internet access	*Line*	*Response*	*Internet filtering*	*Line*	*Response*
Mark (X) all that apply No restrictions	5a	☐	Internet access via pre-selected menu only	6a	Mark (X) one ☐ Yes ☐ No
With parental permission &/or acceptable use agreement	5b	☐	Student terminals filtered: ■ None ■ Some ■ All	 7a 7b 7c	Mark (X) one ☐ ☐ ☐
Restricted by grade level (un-restricted from grade ___ up)	5c	☐			
Other restriction(s)—please specify:	5d	☐	If any student terminals filtered: ■ Decided at district level ■ Decided at building level	 8a 8b	Mark (X) one ☐ ☐

SAMPLE QUESTIONNAIRE – *Do Not Complete or Return*

PART VII - SCHOOL LIBRARY COLLECTION

Please report all holdings regardless of their circulation status (i.e., circulating and non-circulating items). Include only materials available for use by teachers and/or students. Exclude uncataloged materials reserved exclusively for use by school library staff or building administrators (e.g., principal, counselor, secretary). Report average copyright dates. If these figures cannot be obtained 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 dates.

Item	*Line*	*Number*	*Average Copyright Year*
Print volumes	1		
Encyclopedias & reference titles on CD-ROM or laser disk	2		
Magazines & newspapers ■ Current print subscriptions to magazines	3a		**N/A**
■ Current print subscriptions to newspapers	3b		**N/A**
Video materials (cassettes and disks)	4		
Computer software packages for use in school library by students	5		
Does the school library subscribe to ■ Any online periodical services (e.g., FirstSearch, InfoTrac, UMI)?	6a	☐ YES	☐ NO
■ Any CD ROM services (e.g., SIRS, Gale's "Discovering…" series, NewsBank, SuperTOM)?	6b	☐ YES	☐ NO
■ Any other electronic full text services (e.g., E-library)?	6c	☐ YES	☐ NO

SAMPLE QUESTIONNAIRE – *Do Not Complete or Return*

PART VIII - ANNUAL OPERATING EXPENDITURES

Please report the annual operating expenditures for this school library program, including both funds from the school budget and funds obtained from other sources (e.g., grants, donations from parent-teacher organizations). Exclude major one-time capital outlays for computers, furniture, and other equipment.

Item	*Line*	*School Budget (1)*	*All Other Sources (2)*
Books and all other print materials (include magazines & newspapers)	1	.00	.00
Materials in electronic formats (e.g., software, CD-ROM, laser disk, locally-mounted databases)	2	.00	.00
Non-print materials (e.g., audio, video, microform)	3	.00	.00
Electronic access to information (e.g., online database searching, Internet access)	4	.00	.00
Other operating expenditures	5	.00	.00
TOTAL OPERATING EXPENDITURES (Sum of VIII 1-5)	**6**	**.00**	**.00**

PART IX - ANNUAL CAPITAL OUTLAY

Please report the annual capital outlay for this school library program, including the costs of computers, furniture, and other equipment.

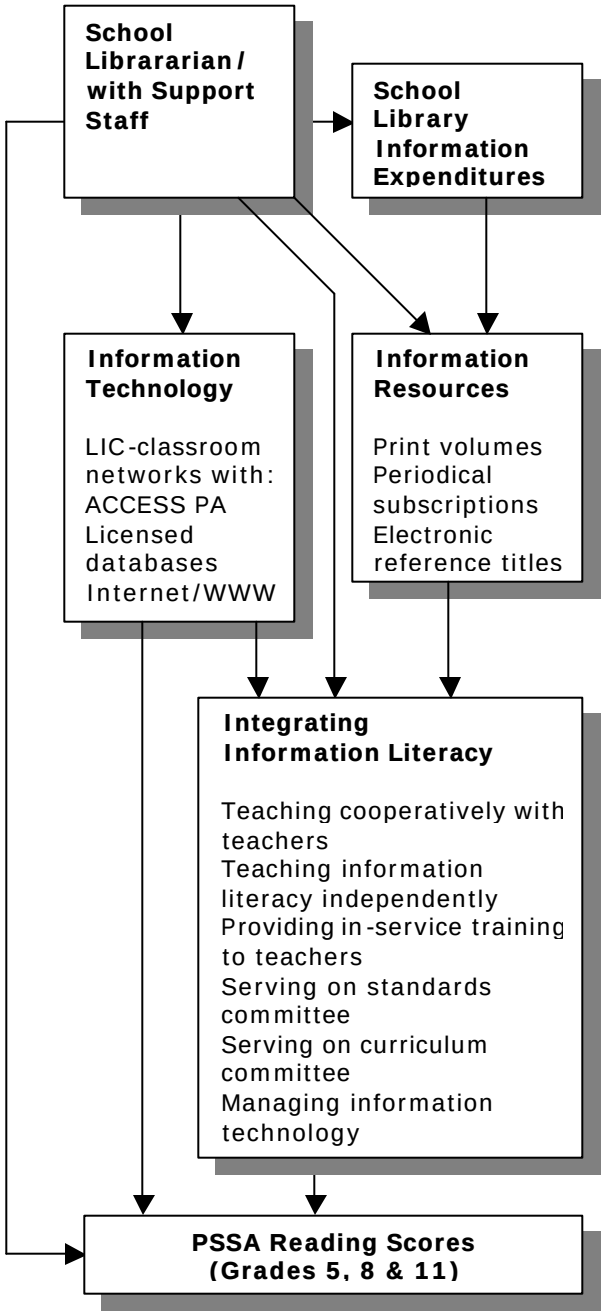
Item	*Line*	*School Budget (1)*	*All Other Sources (2)*
Equipment (e.g., computers, CD-ROM drives, VCRs)	1	.00	.00
Other capital purchases (e.g., furniture, shelving)	2	.00	.00
TOTAL CAPITAL OUTLAY (Sum of IX 1-2)	**3**	**.00**	**.00**

PART X - SCHOOL LIBRARY MANAGEMENT

Please answer each of the following questions—all simple YES/NO items.

Item	*Line*	*Response*	
Does the school library program receive a budget?	1	☐ YES	☐ NO
If YES, do school library staff submit a budget request?	2	☐ YES	☐ NO
Does the school library program have an advisory committee?	3	☐ YES	☐ NO
Do school library staff meet regularly with local public library staff?	4	☐ YES	☐ NO
Have there been any challenges (reconsiderations) of materials in your school library's collection during the past year?	5	☐ YES	☐ NO

SAMPLE QUESTIONNAIRE – *Do Not Complete or Return*



Other School Library Impact Studies

For more information about recent research on the impact of school library information programs on academic achievement, visit the Library Research Service web site, http://www.lrs.org. Links are provided to:

- **The Impact of School Library Media Centers on Academic Achievement** (the original 1993 Colorado study),
- **Information Empowered**: *The School Librarian as an Agent of Academic Achievement in Alaska* (1999), and
- **How School Librarians Help Kids Achieve Standards** (2000).

Contact Information

Direct questions and comments about the Pennsylvania study and requests for a speaker on this topic to:

Keith Curry Lance or
Marcia J. Rodney
Library Research Service
201 E. Colfax Ave., Suite 309
Denver, CO 80203-1799
Tel.: 303-866-6737
Fax: 303-866-6940
E-mail: klance@sni.net or
mrodney@du.edu

Measuring Up to Standards

The Impact of School Library Programs & Information Literacy in Pennsylvania Schools

Keith Curry Lance
Marcia J. Rodney
Christine Hamilton-Pennell

Pennsylvania Citizens for Better Libraries

This research was supported with a Library Services and Technology Act (LSTA) grant administered by the Office of Commonwealth Libraries, Pennsylvania Department of Education

Pennsylvania System of School Assessment (PSSA) reading scores increase with increases in:

Staffing

- School librarian staff hours
- Support staff hours

Information Technology

Networked computers linking library & classrooms

- with ACCESS PENNSYLVANIA Database
- with licensed databases
- with Internet/World Wide Web

Integration of Information Literacy with the Curriculum

Time spent by school librarians...

- Teaching cooperatively with teachers
- Teaching information literacy independently
- Providing in-service training to teachers
- Serving on standards committee
- Serving on curriculum committee
- Managing information technology

With increases in staffing—especially LIS staffing—there are corresponding increases in

- Expenditures
- Information Resources
- Information Technology
- Integration of Information Literacy with Curriculum

In addition, increased integration of information literacy is associated with

- higher levels of staffing,
- larger collections of information resources, and
- information technology that takes the LI program closer to teachers and students

Our library has become a “kid magnet" where students are engaged in active, authentic learning. *Patricia Kolencik, North Clarion High School*

Teachers say to students when faced with a need for information: "have you asked the librarian, have you been to the library,?" Teachers and librarians work together. *Lois McNicol, Garnet Valley High School*

These predictors of academic achievement cannot be explained away by

School Differences

- School expenditures per pupil
- Teacher characteristics (education, experience, salaries)
- Teacher/pupil ratio
- Student characteristics (poverty, race/ethnicity)

Community Differences

- Adult educational attainment
- Families in poverty
- Racial/ethnic demographics

When we open before school, students are poring over leisure reading. They've even asked if I would set up a cappucino bar. *Paul Scaer, JR Masterman School*

A computer center …a library … teaching -- the result is a student body with good skills. *Annabel Grote,*

ED3/110.10/No. 164 November 19, 1999

FAST FACTS

Recent Statistics from the Library Research Service

Proof of the Power

A First Look at the Results of the Colorado Study ... and More!

The Latest Statewide Studies

During 1998 and 1999, three statewide studies of the impact of school library media centers on academic achievement have been conducted. The forthcoming reports on these studies are:

- **Information Empowered: The School Librarian as an Agent of Academic Achievement in Alaska**,
- **Measuring Up to Standards: The Role of Library Information Programs & Information Literacy in Pennsylvania Schools**, and
- **How School Librarians Help Kids Achieve Standards** (a.k.a. *the second Colorado study* or *Colorado II*).

The Information Power Model & Previous Research Findings

The **Information Power** model developed by the American Association of School Librarians (AASL) focuses on three major themes for library media (LM) programs—collaboration, leadership, and technology—and three major roles for library media specialists (LMSs)—learning and teaching, information access and delivery, and program administration.

The findings of previous research on this topic can be summarized by the LMS role:

Learning & Teaching

Previous research demonstrates that academic achievement of K-12 students is higher where the LMS:

- is part of a planning/teaching team,
- teaches information literacy independently, and
- works one-to-one with students in a flexibly scheduled program.

Information Access & Delivery

Previous research also associates higher academic achievement with:

- a quality collection of books and other materials selected to support the school's curriculum and used by both teachers and students,
- state-of-the-art technology that is integrated into the learning/teaching and information-seeking processes, and
- cooperation between LMCs and other libraries, especially public libraries.

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Program Administration

Previous research has also established that higher academic achievement is associated with:

- LM programs that are staffed to play an integral role in the school (minimally, at least one LMS with at least one aide),
- principal support of the LM program and collaboration between classroom teachers and the LMS,
- information technology that extends the reach of the LM program into the school's classrooms and labs, and
- a well-organized, formally requested budget adequate to support these conditions.

Each of the three study reports will include a detailed analysis of the previous literature as well as an exhaustive bibliography.

Motivations for Further Research

With the above-mentioned facts well established by previous research, one might rightly ask why further research was necessary.

A prime motivation for the new studies was to confirm the findings of the original Colorado study**, The Impact of School Library Media Centers on Academic Achievement**. Both practitioners and policymakers want to know that those findings:

- can be replicated using standards-based tests;
- hold up over time; and
- apply to other states.

In addition, all three of the new studies seek to expand on the original Colorado study by demonstrating the value of:

- specific activities that define the LMS role;
- principal and teacher support;
- flexible scheduling; and
- technology as part of LM programs.

Samples

Between them the three new studies involve over 800 schools in three states, and the participating schools serve both elementary and secondary grades—both middle and high school levels.

The Alaska study includes 211 of the state's 461 schools—46 percent of the schools serving the three tested grades: 4, 8, and 11.

The Pennsylvania study includes 435 of the state's 1,691 schools serving three tested grades: 5, 8, and 11. The 435 participating schools constitute an 87 percent response rate from a 500-case sample.

There are 200 schools in the new Colorado study. These participants constitute a 67 percent response rate from a 300-case sample of the state's 1,178 schools serving two tested grades: 4 and 7. (Statewide standards-based testing at the high school level has not yet begun.)

School Library Surveys

Alaska's school libraries were surveyed in Fall 1998. Counterpart surveys in Colorado and Pennsylvania were conducted in Spring 1999. While there were some minor differences among these surveys, all three were based on Colorado's 1998 questionnaire, and all three addressed five common sets of issues:

- staffing levels;
- time spent on a variety of staff activities;
- collection holdings by format;
- usage levels; and
- available technology and its functionality.

Available Data

In addition to original data collection via the above-mentioned surveys, all three studies also relied heavily on available data, including:

- state reading test scores (various grades indicated above),
- community characteristics, such as its
  - level of adult educational attainment;
  - socio-economic differences (e.g., income levels, poverty status); and
  - racial/ethnic demography.
- school characteristics, such as:
  - teacher-pupil ratio;
  - teacher characteristics (e.g., percent with master's degrees, average years of experience, average salary); and
  - student characteristics (e.g., racial/ethnic demography, those eligible for the National School Lunch Program-—an indicator of socio-economic status).

Successful Types of Library Media Predictors

Four major types of library media program data were found to be predictors of academic achievement in at least two, if not all three, states:

- level of LM program development (e.g., staffing level, collection size, program expenditures);
- staff activities related to the **Information Power** themes of leadership, collaboration, and technology;
- levels of LM program usage; and
- technology (e.g., school-wide networks providing access to licensed databases as well as the Internet/World Wide Web).

Alaska Findings

The Alaska study yielded five major predictors of academic achievement:

- level of librarian staffing;
- time spent by librarians
  - delivering information literacy instruction to students,
  - planning cooperatively with teachers, and
  - providing in-service training to teachers;
- a collection development policy that addresses the issue of challenges or requests for reconsideration of materials;
- the potential for Internet connectivity (i.e., computers with modem capability and telecommunications lines); and
- a relationship with the local public library.

Notably, this study could only demonstrate the efficacy of librarians, because there were too few cases of schools with both a librarian and an aide.

See Figure 1 for a graphic representation of the relationships among these variables and academic achievement in Alaska.

Pennsylvania Findings

The Pennsylvania study also yielded five major predictors of academic achievement:

- the presence of both librarians and support staff;
- the level of library expenditures (excluding staff salaries);
- the presence of rich collections of print and electronic information resources (i.e., books, periodical subscriptions, CD-ROM reference titles);
- the extent to which technology is utilized to extend the library information center's reach into the school's classrooms and labs (e.g., ACCESS PENNSYLVANIA Database, licensed databases, Internet/World Wide Web); and, pivotally,

- the extent to which information literacy is integrated in the school's approach to standards and curriculum (e.g., time spent by library information specialists meeting with principals; teaching cooperatively and independently; attending faculty, curriculum committee, and standards committee meetings; managing information technology).

See Figure 2 for a graphic representation of the relationships among these variables and academic achievement in Pennsylvania.

Colorado Findings

Five sets of predictors of academic achievement were yielded by the second Colorado study:

- library media program development;
- leadership;
- collaboration;
- technology; and
- flexible scheduling.

Library Media Program Development

As in the original Colorado study, a single factor encompasses all of the data about the library media program's level of development. Several characteristics of LM programs are strongly interrelated with each other, and, together, they constitute a positive, statistically significant predictor of academic achievement. A program's standing on this development factor is driven by:

- the number of LMS and total staff per 100 students,
- the number of volumes per student as well as the number of print subscriptions and CD-ROM reference titles per 100 students, and
- LM expenditures per student.

Leadership

One of the major themes of **Information Power** is leadership. Library media specialists who exhibit leadership are more likely to have a positive effect on academic achievement. In Colorado, indicators of such leadership include time spent by the LMS:

- meeting with the principal;
- participating in faculty meetings and serving on standards and curriculum committees; and
- holding meetings of building and district level LM staff and participating in meetings of other LM professionals beyond the district (e.g., regional, state, and national conferences).

Collaboration

In **Information Power**, collaboration is billed above leadership, but the findings of this study indicate that leadership's impact on academic achievement is to be the prime mover behind collaboration with teachers. Where the LMS exhibits leadership, she or he is also more likely to:

- plan cooperatively with teachers;
- teach cooperatively with teachers as well as independently;
- provide in-service training to teachers; and
- manage the computer network that links the LMC, classrooms, and labs.

Technology

One of the strategic mistakes of the original Colorado study was to collect data on numbers of computers in or under the jurisdiction of the school library alone. Of course, many computers used in instruction are located in classrooms and labs, and this time they were not left out. The only stipulation on which computers to count beyond those in the LMC was that they had to be networked to LM resources, such as the library catalog, licensed databases, and the Internet/World Wide Web. Statistical indicators of the importance of this kind of technology and the LM program's role in it include:

- the number of computers per 100 students;
- the number of computers providing access to licensed databases per 100 students; and
- the number of Internet-accessible computers per 100 students.

Flexible Scheduling

Previous research indicates that students perform at higher levels when their access to the LMC is not limited to regularly scheduled class visits. Students should be free to visit the LMC as their learning needs dictate. Ideally, some of these visits would still be in whole class groups, but others would be as part of smaller groups and individually. In reality, a fairly common practice is to schedule classes for regular LMC visits to provide planning and meeting time for teachers. All too often, during these periods, the LMC staff are little more than babysitters. An interesting, unexpected finding of this study is that individual student visits to the LMC correlate with test scores, but group visits—at least, group visits of the sort most common now—do not.

See Figures 3 and 4 for graphic representations of the relationships between and among these predictors and academic achievement in Colorado. There are two figures in order to indicate differences in these relationships for grades 4 and 7.

Key Common Findings

While findings from the three states studied most recently vary somewhat, they share some key common findings:

- School library media specialists can and do exert a positive and significant effect on academic achievement.
- Principal support of the LM program and teacher collaboration with the LMS are critical to making the LM program an integral part of teaching and learning.
- For the LMS to be a pivotal player, support staff are essential. A professional LMS cannot do her or his job if tethered to the LMC.
- The LMS has a teaching role—both as a co-teacher of information literacy to students and as an in-service trainer of teachers.
- LM programs that contribute most strongly to academic achievement are those with the technology necessary to extend access to information resources beyond the LMC to classrooms and labs throughout the school.

Distinguishing Results

While the three studies share common findings, each also offers some distinguishing results.

- The Alaska study was the first to suggest the important role of the LMS as an information literacy teacher of students as well as an in-service training provider for teachers.
- The Pennsylvania study demonstrates that the synergy of LM staff, collections, and technology is most powerful where there is an integrated, collaborative approach to teaching information literacy.
- The Colorado study reveals that the relationship between leadership and collaboration is critical. Classroom teachers are more willing to collaborate with the LMS if she or he has taken the initiative to become an assertive, involved leader in the school. In addition, this study provides additional evidence linking flexibly scheduled LM programs with higher levels of academic achievement.

Controlling for School & Community Differences

As in the original Colorado study, each of these studies confirms that the relationships described above are not explained away by other school differences, such as:

- teacher-pupil ratio;
- teacher or student characteristics; and
- per pupil expenditures.

Likewise, these relationships cannot be explained away by community differences, such as:

- adult educational attainment;
- socio-economic differences (e.g., income levels, poverty status); and
- racial/ethnic demography.

Recommended Actions

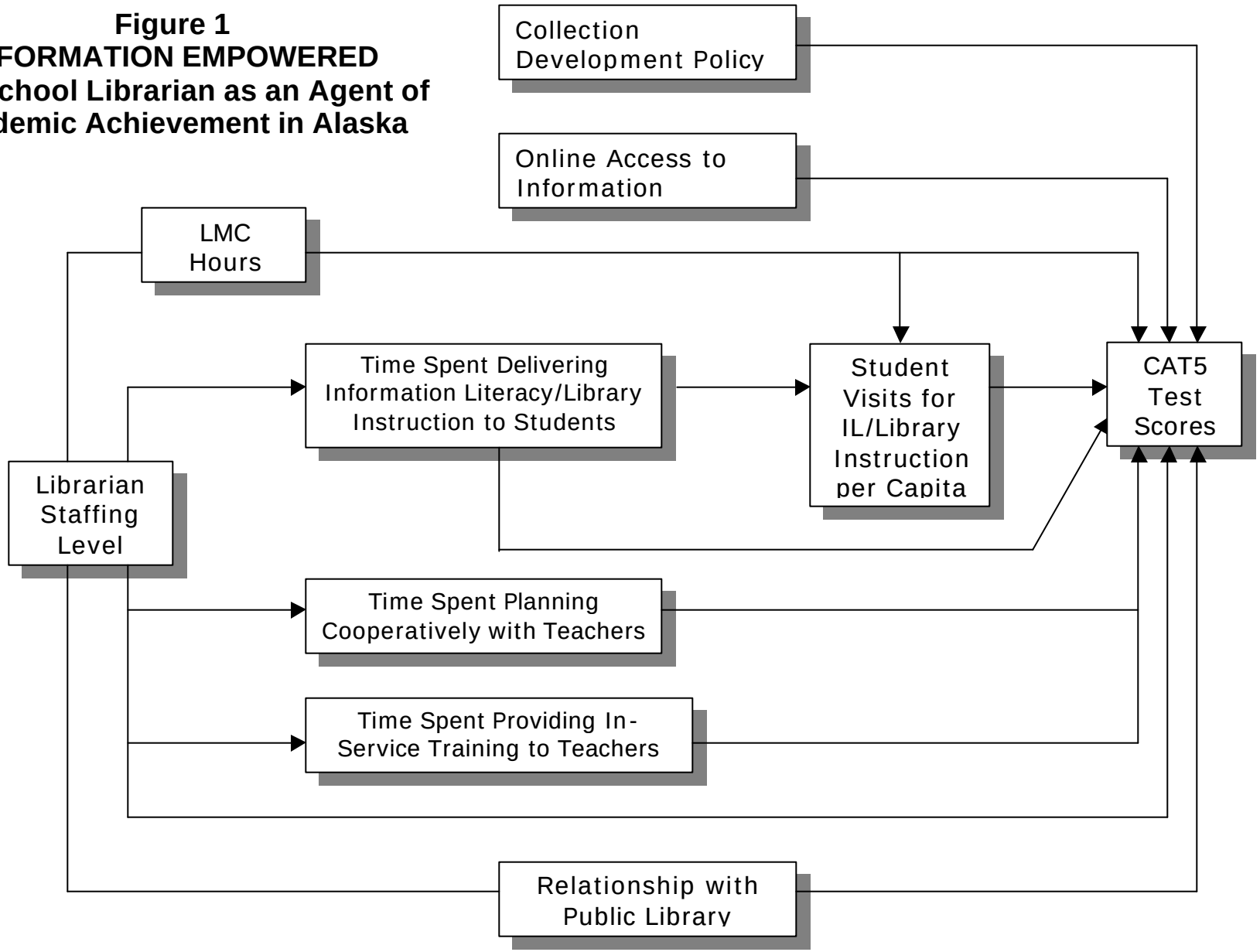
The combined weight of these three studies recommends several fairly obvious actions:

- Library media programs should be funded to have 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.
- Library media specialists must assert themselves as leaders in their schools. Principals can do much to make this possible, including adopting policies and practices and communicating expectations that encourage LMSs to act as professional educators and classroom teachers to accept them as colleagues.
- The library media program cannot be limited to the library media center as a place. Just as LMSs must involve themselves in the design and delivery of instruction, 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 LMS 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.
- Wherever possible, schools should adopt policies of flexible scheduled access to the LMC. Available evidence indicates that LMCs that are reasonably accessible to students contribute more to academic achievement.

For More Information

For information about how to obtain copies of the reports for each of these studies, watch the Library Research Service web site, www.lrs.org, or contact the individual state library agencies. Also on the LRS web site, a PowerPoint presentation corresponding to this document is available. These slides were used in a session at the November 1999 joint conference of the American Association of School Librarians and the International Association for School Librarianship.

Figure 1
INFORMATION EMPOWERED
The School Librarian as an Agent of Academic Achievement in Alaska



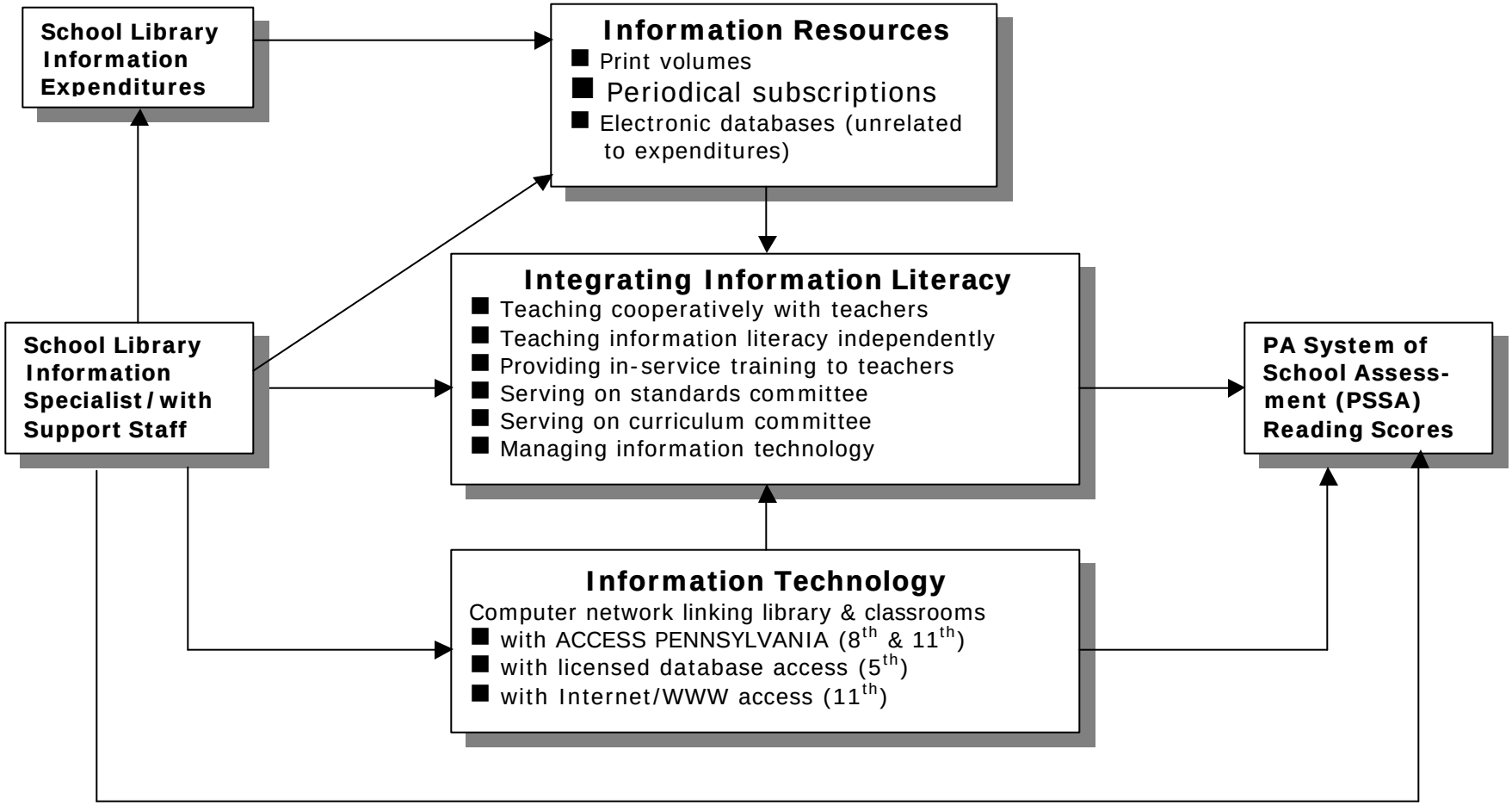


Figure 2
MEASURING UP TO STANDARDS
The Impact of School Library Programs & Information Literacy in Pennsylvania Schools

Controlling for School Differences

- School expenditures per pupil
- Teacher characteristics (education, experience, salaries)
- Teacher/pupil ratio
- Student characteristics (race/ethnicity, poverty)

Controlling for Community Differences

- Adult educational attainment
- Race/ethnicity
- Families in poverty

Figure 3

How School Librarians Help Kids Achieve Standards

The 2nd Colorado Study

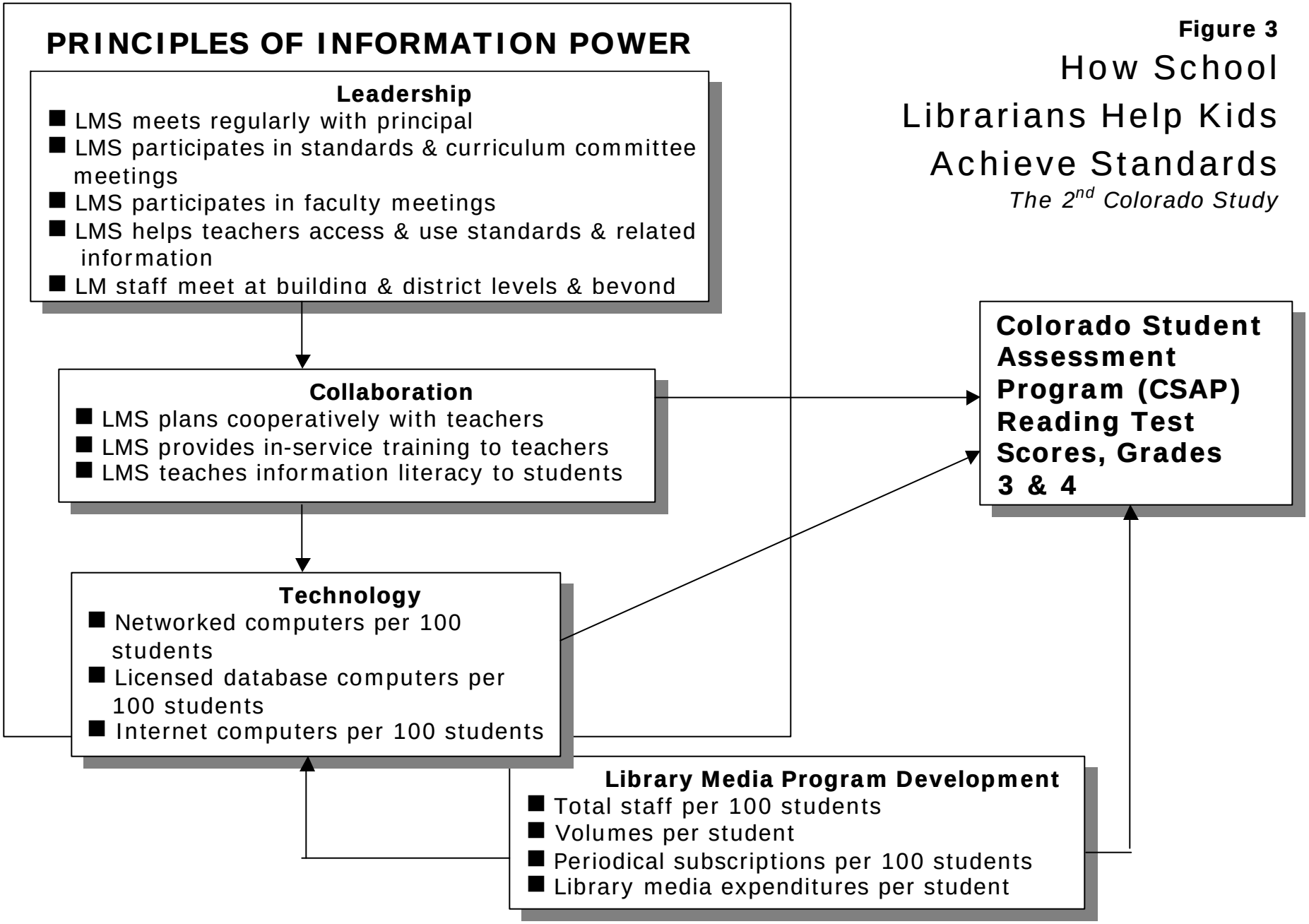


Figure 4

How School Librarians Help Kids Achieve Standards

The 2nd Colorado Study