

**An Essential Connection:  
How Quality School Library Media Programs Improve  
Student Achievement in North Carolina**

**Robert Burgin  
Pauletta Brown Bracy  
With assistance from Kathy Brown**

*RB Software & Consulting*

*<http://www.rburgin.com>*

*June 2003*

## Table of Contents

Acknowledgements .....	3
Executive Summary .....	4
Introduction .....	5
Review of the Literature .....	6
Methodologies .....	26
Findings.....	33
Conclusions.....	51
Works Cited.....	54
Appendix A. Survey Instrument.....	56

## **Acknowledgements**

“An Essential Connection: How Quality School Library Media Programs Improve Student Achievement in North Carolina” was a research project designed to collect data on school library media programs in North Carolina in eight areas: staff activities; service hours; library usage; library technology; Internet access; operating expenditures; management; and school demographics.

The authors wish to thank the staff members of the schools that responded to the survey. These individuals made time in their busy schedules to report the data required to complete this statewide survey, and without their efforts, the study would not have been possible.

We also wish to thank Keith Curry Lance and Marcia J. Rodney of the Library Research Service of the Colorado Department of Education for permitting us to adapt their survey instrument and for providing us with invaluable advice and support.

Finally, we wish to acknowledge the financial assistance of the North Carolina Library Association as well as the support in various other ways of the State Library of North Carolina, the North Carolina School Library Media Association, and the North Carolina Department of Public Instruction.

## Executive Summary

School library programs in North Carolina elementary, middle school, and high schools have a significant impact on student achievement – as measured by scores on standardized reading and English tests.

Scores on standardized reading and English tests in the schools included in this study tended to increase when libraries in the schools:

- ✓ Were staffed more hours during the school week
- ✓ Were open more hours during the school week
- ✓ Had newer books
- ✓ Spent more money per 100 students on books and other print materials like magazines and newspapers
- ✓ Spent more money per 100 students on electronic access to information (e.g., online database searching, Internet access)
- ✓ Were more likely to subscribe to online periodical services
- ✓ Were more likely to subscribe to CD ROM services

These findings are consistent with those of earlier studies in Alaska, Massachusetts, Colorado, Pennsylvania, Oregon, Texas, Iowa, and California, all of which found similar links between student achievement and the quality of school library programs.

## Introduction

The state of North Carolina has enjoyed a long and favorable reputation as a leader in school media librarianship. We have taken pride in developing and maintaining strong programs, which have warranted our significance in the local schools. The “No Child Left Behind Act,” which requires that all teachers are qualified in core subjects, clearly impacts the vital contributions school library media specialists make in the academic lives of North Carolina’s children. Recognizing these developments and the importance of conducting research to confirm our beliefs and the perceptions of our classroom and administrative colleagues, the North Carolina Library Association and the North Carolina School Library Media Association in collaboration with the North Carolina Department of Public Instruction and the State Library of North Carolina sponsored this study to determine the impact of school library programs on student achievement in North Carolina public schools.

This study was based on research by the Library Research Service of the Colorado State Library, which in 1993 published a landmark study, *The Impact of School Library Media Centers on Academic Achievement*. Since then, the Library Research Service has conducted similar studies in Alaska, Pennsylvania, Oregon, and Iowa; the Service has also repeated the original study in Colorado. In every case, the researchers have found that school library media programs have a significant impact of student achievement at the elementary, middle, and high school levels.

## Review of the Literature

When school library media specialists consider student learning or student achievement, they may be reminded of the history of the profession's standards and realize how related those standards are to the federal legislation for educational reform enacted last year. This review of related research contains reports of recent statewide studies conducted in Alaska, California, Colorado, Iowa, Massachusetts, Oregon, Pennsylvania, and Texas, which have focused on student achievement. All have sought to explore the relationship between student achievement and the school library media program. First, for context, the standards and the legislation are discussed.

### The Context

The current set of standards for the school library media profession, *Information Power: Guidelines for School Library Media Programs* (American Association of School Librarians 1988), is founded on the stated mission of the library media program, which is to ensure that students and staff are effective users of ideas and information. Seven specific objectives provide guidance for accomplishing the mission:

1. To provide intellectual access to information
2. To provide physical access to information
3. To provide learning experiences that encourage users to become discriminating consumers and skilled creators of information
4. To provide leadership, instruction, and consulting assistance in the use of instructional and information technology
5. To provide resources and activities that contribute to lifelong learning
6. To provide a facility that functions as the information center of the school
7. To provide resources and learning activities

Recognition of the explosive growth of information and the role of the profession in responding to this phenomenon, led to the publication of *Information Power: Building*

*Partnerships for Learning* (American Association of School Librarians 1998) and its companion volume, *Information Literacy Standards for Student Learning* (American Association of School Librarians 1998). The latter provides a conceptual framework and broad guidelines for describing the information-literate student. The mission of school library media programs as affirmed in 1988 remains relevant today. It focuses on offering programs and services that are centered on information literacy and that are designed around active, authentic student learning. The goals of today's library media program denote the development of a community of learning that is centered on the student and sustained by a creative, energetic library media program.

The nine standards which follow are categorized into three domains of: information literacy; independent learning; and social responsibility.

The student who is information literate:

1. Accesses information efficiently and effectively
2. Evaluates information critically and competently
3. Uses information accurately and creatively

The student who is an independent learner is information literate and:

4. Pursues information related to personal interests
5. Appreciates literature and other creative expressions of information
6. Strives for excellence in information seeking and knowledge generation

The student who contributes positively to the learning community and to society is information literate and:

7. Recognizes the importance of information to democratic society
8. Practices ethical behavior in regard to information and information technology

9. Participates effectively in groups to pursue and generate information

On January 8, 2002, President Bush signed into law the *No Child Left Behind Act of 2001* (NCLB). It is the most encompassing reform to date of the 1965 enactment of the Elementary and Secondary Act. The act is based on four principles (stronger accountability for results; increased flexibility and local control; expanded options for parents; and an emphasis on teaching methods that have been proven to work) and is designed to improve student achievement. Library media specialists have potential roles in major aspects of *No Child Left Behind*.

For teachers and library media specialists, accountability rests within schools that must measure every public school student's progress in reading and math in each of grades 3-8 and at least once during grades 10-12. *No Child Left Behind* also targets resources for early childhood education so that all children are properly prepared at the start of their education.

Another provision of the legislation is improved teaching and learning by providing information to teachers and principals. Annual tests measuring students' progress will inform teachers so that they may create meaningful learning experiences to ensure that students ultimately meet or exceed standards.

*No Child Left Behind* also addresses resources for schools. Increased allocations will go to schools to help districts improve the education of disadvantaged students, turn around low performing schools, improve teacher quality, and increase choices for parents.

A special emphasis is on implementing educational programs and practices that have been validated in rigorous scientific research. Probably, the best known program is Reading First, which makes federal funds available to help reading teachers retool with instructional techniques verified to be effective.



Thus, library media specialists can serve vital roles in the process of attaining and sustaining student achievement. Advising in the development of essential resource collections, collaborating with teachers in delivering instruction, and in identifying critical research and/or participating in such can ensure strategic assistance in this momentous movement. Clearly, the opportunities prevail, but these also provide insight into the profession's earlier awareness of student learning as evidenced in the standards of 1988. Library media specialists guided by the standards have been addressing student achievement by engaging in the behaviors to support it. The legislation, in a sense, affirms the professional mission. The seven objectives and nine information literate student learning outcomes all can resourcefully contribute to student achievement.

## **The Studies**

### Alaska, 2000

Declining test scores provided the impetus for the Alaska State Library to commission an investigation to determine the impact of school library media programs and school librarians on academic achievement (Lance, Hamilton-Pennell and Rodney 2000). During the 1997-1998 school year, schools were surveyed about their staffing levels, hours of operation, staff activities, usage, technology, policies, and cooperation with public libraries. Student performance on the California Achievement Tests (CAT5) in reading, language arts, and mathematics in grades 4, 8, and 11 were examined to determine relationships between these predictors and test scores.

The findings of this study are summarized in four areas: staffing; staff activities; library media program usage; and partnerships, technology, and policies. Test scores tended to be higher in schools with librarians, particularly full-time librarians rather than part-time librarians, although a part-time librarian was better than no librarian at all. Higher levels of librarian staffing were associated with longer hours of operation for the library media center; higher levels of media staff activity; higher student usage; and higher test scores. The higher the level of librarian staffing, the greater the percentage of library

media staff hours dedicated to delivering library/information literacy instruction to students and providing in-service training to teachers and other staff. Regardless of the level of library staffing, the more library media staff time devoted to these activities, the higher the test scores. The more often students received library/information literacy information in which library media staff were involved, the higher the test scores. Finally, test scores also tended to be associated with cooperative relationships between library media centers and public libraries; library media programs that had facilities required to reach the Internet and the World Wide Web; and collection development policies that addressed reconsideration of materials.

This study added new knowledge to the discussions by exploring predictors of student achievement not previously addressed in other studies. Variables of specific staff activities, online access to information, and collaboratives were discovered to be feasible predictors of student achievement as revealed through test scores. The findings of this investigation corroborate studies and demonstrate empirical support for the principles of *Information Power: Building Partnerships for Learning*.

### Colorado, 2000

Following the renowned 1993 Colorado study, *The Impact of School Library Media Centers on Academic Achievement* (Lance, Welborn, and Hamilton-Pennell, 1993), the second Colorado study served as a follow-up and addressed new areas of exploration (Lance, Rodney, and Hamilton-Pennell 2000a).

The compelling results of the first study demonstrated that quality library media programs – those with more professional library media specialist positions and larger and more diverse collections – led to higher student test scores and confirmed the positive effect on student test scores of library media specialists and classroom teachers working together.

The study also identified an area for further research in determining specific types of

collaboration between library media specialists and classroom teachers. In addition, testing in the state had changed since the first study, so there was an interest in the validity of findings under new testing requirements. Finally, at the time of the earlier study, data on technology was limited. The new study sought to update technological presence and determine its current value in Colorado schools and library media centers. In its expansion, the 2000 study also measured the impact of student achievement on specific leadership and collaboration activities of library media specialists; principal and teacher engagement in library media programs; and information technology, especially networked computers offering licensed databases and the Internet/World Wide Web. Grades 4 and 7 were in the sample.

Colorado Student Assessment Program (CSAP) reading scores served as the test measurement. These scores tended to increase in the following areas of library media programs: program development; information technology; teacher/library media specialist collaboration; and individual visits to the library media center. Also, as participation in leadership roles increased, so did collaboration between teachers and library media specialists.

Six predictors of student success were evident in library media program development. Reading test scores increased with increases in the library media specialists' hours per 100 students in 7<sup>th</sup> grade; total staff hours per 100 students; print volumes per student; periodical subscriptions per 100 students; electronic reference titles per 100 students in 7<sup>th</sup> grade; and library media expenditures per student.

Students in schools where networked computers linked library media centers with classrooms, labs, and other instructional sites had higher test scores. These scores were particularly linked to the number of computers enabling teachers and students to utilize library media resources, either within the library media center or networked to the library media center, licensed databases, and the Internet/World Wide Web.

The importance of a collaborative approach to information literacy was reiterated in this

study. Evidence revealed that test scores were higher in elementary and middle schools in which library media specialists and teachers worked together. In addition, scores increased with the amount of time library media specialists spent as in-service trainers of other teachers. More specifically, test scores increased as library media specialists spent more time engaged in the following activities:

- ✓ Planning cooperatively with teachers in 7<sup>th</sup> grade
- ✓ Identifying materials for teachers
- ✓ Teaching information literacy skills to students
- ✓ Providing in-service training to teachers
- ✓ Managing a computer network through which the library media program reaches beyond its own walls to classrooms, labs, and offices in the 7<sup>th</sup> grade.

The value of flexible scheduling was likewise corroborated in this study. Freedom in the middle school to visit the library media center as an individual separate from a class visit was a strong indicator of higher test scores. Middle schools with high test scores tended to have library media centers that reported a high number of individual visits to the library media center on a per student basis.

Although leadership involvement of the school library media specialist did not produce a direct effect on test scores, it was determined to have a strong impact on test scores. At both elementary and middle school levels, the more the library media specialist was involved in school and library media professional activities, the higher level of collaboration. Higher levels of collaboration resulted from media specialists meeting regularly with school administrators, serving on standards and curriculum committees, working with faculty at school-wide staff meetings, and meeting with library media staff at the building level.

At the elementary level, library media program development (including staffing, collections, and expenditures, along with technology) were strong predictors of each other as well as test scores. At the seventh grade level, a strong relationship existed

between library media program development and flexible scheduling.

### Pennsylvania, 2000

The Pennsylvania Department of Education's Office of Commonwealth Libraries determined a need to inform school decision-makers and stakeholders of the impact of good school library programs in schools. Thus, the state became the first east of the Mississippi to replicate the 1993 Colorado study. The Pennsylvania research was conducted during the 1998-1999 academic year (Lance, Rodney, and Hamilton-Pennell 2000b). Librarians in elementary, middle, and senior high schools were surveyed and test scores for grades 5, 8, and 11 were examined for correlations between student achievement and eight areas: hours of the school library; school library staff; paid staff activities; usage of library services; school library technology; school library resources; annual operating expenditures and capital outlay for the school library; and school library information management. School achievement was defined as performance on Pennsylvania System of School Assessment (PSSA) reading tests.

Findings indicated that reading scores increased with increases in the following characteristics of school library media programs:

- ✓ Staffing in the hours of the librarian and support staff
- ✓ Information technology where classrooms, labs, and other instructional sites and school libraries were linked with networked computers (Higher scores were also linked to the numbers of computers.)
- ✓ Integration of information literacy into the curriculum, in which school librarians spent more time teaching cooperatively with teachers, teaching information literacy skills independently, providing in-service training to teachers, serving on standards and curriculum committees, and managing information technology
- ✓ Higher levels of operating expenditures

In addition, as library staffing, information resources and information technology rose,

so too did the involvement of school librarians in teaching students and teachers how to find and assess information.

For predictability, the researchers asserted that when all library predictors were maximized, reading scores tended to run 10 to 15 points higher.

### Massachusetts, 2000

A statewide study designed by James C. Baughman and Mary Eldringhoff to provide baseline data for Massachusetts public schools examined the relationship between 1998 Massachusetts Comprehensive Assessments System (MCAS) scores and the presence of a school library program (Baughman 2000). Mean MCAS cores tended to be higher in schools with school library programs at all levels, as opposed to schools that did not have school library media programs.

Questionnaires were mailed to every public school in Massachusetts – elementary, middle, junior high, high, charter, vocational technical, and regional. General findings for grade levels were reported.

For each grade level:

- ✓ School library programs improved MCAS scores.
- ✓ Students scored higher on MCAS tests when there was a higher per pupil book count.
- ✓ Student use of the library produced higher mean MCAS scores.
- ✓ Hours open made a difference in MCAS scores.

For elementary and middle/junior high schools:

- ✓ Students scored higher on MCAS tests when there was a library instruction program.

- ✓ Average MCAS scores were higher with larger per pupil expenditures for school library media programs.

At elementary and high school levels:

- ✓ Students who were served by a full-time school librarian had higher MCAS scores than those in schools without a full-time librarian.
- ✓ Library staff assistance (nonprofessional help) made a positive difference in average MCAS scores.

At the elementary school level:

- ✓ Students scored higher on the MCAS tests when the library was aligned with the state curriculum frameworks. (This was especially true in consideration of the socioeconomic factor.)

At the high school level:

- ✓ Schools with automated collections had higher average MCAS scores.

In examining the socioeconomic factor, the researchers concluded that there was a high degree of correlation between higher scores and the percentage of free school lunches. As the percentage of free school lunches increased, mean scores decreased. For elementary schools, empirical evidence presented showed that children from schools with a high free lunch program could learn effectively when provided with school library resources and services. This finding led researchers to declare the need to provide the necessary resources for education so that each child could work to his or her maximum potential.

At the elementary level, fifteen variables were identified to be statistically significant when examining MCAS scores. Researchers, therefore, concluded that Massachusetts

elementary schools need:

- ✓ Hours of service, including before and after school
- ✓ Strong library collections – per pupil book count, and non-print items
- ✓ High library expenditures per pupil
- ✓ Alignment of the library collections
- ✓ Robust staffing, including a full-time librarian, non-professional assistance, and parent volunteers.

Analysis of the scores in middle schools led investigators to recommend that the middle school program should consider the following aspects of library offerings:

- ✓ Hours of service, including after school service
- ✓ Books per pupil
- ✓ Number of periodicals, including periodical databases
- ✓ Expenditures per pupil for materials
- ✓ Library instruction programs
- ✓ Participation in the regional library systems
- ✓ Parent volunteers, including PTO donations

Finally, at the high school level, a statistically significant link between mean MCAS test scores and school library variables were found for:

- ✓ After school hours
- ✓ Books per pupil
- ✓ Participation in the regional library system
- ✓ Percentage of the student body visiting the library
- ✓ Having a full-time librarian
- ✓ Staff assistance

Based on the research, the successful implementation of the curriculum frameworks



depends immeasurably on a strong school library program. Achieving good MCAS scores depends precisely on the good working combination of successful administrative leadership, team building for the implementation of the curriculum frameworks, excellence in teaching, and strong library resources in every school.

### Oregon, 2001

Concerned about the declining condition of library media programs in Oregon public schools, the Oregon State Library and the Oregon Educational Media Association proposed to document the impact of library media programs and share the information with policymakers and the education and library professions. In addition to validating the findings of the 1993 landmark Colorado study, this study explored other issues of specific activities of library media staff that affected student achievement; contributions of teacher and principal support of the library media programs to the efficacy of the library media specialists; and the role of information technology in library media programs, especially licensed databases and the Internet.

The survey of library media programs focused on several sets of potential predictors of academic achievement: library media center hours; library media staff and their activities; technology; library media center usage; library media resource collections; and finances. Test scores for grades 5, 8, and 10 on the Oregon state reading test were used as indicators for achievement. Results revealed that at all three school levels, specific characteristics of each type program characteristic helped to predict scores either directly or indirectly.

Library media programs in Oregon elementary schools influenced fifth grade reading scores both directly and indirectly. Information resources and technology and library media center usage affected test scores directly, while library media staffing levels, staff activities, and library media expenditures exerted indirect effects.

Fifth grade reading scores tend to be higher for schools whose library media centers:

- ✓ Had larger collections of print volumes
- ✓ Were visited more often by individual students
- ✓ Were visited more often by groups of students for Information Literacy instruction
- ✓ Were linked to classrooms by a computer network

Eighth grade reading scores were influenced both directly and indirectly by library media programs. At this level, there were many more direct predictors than at the elementary level and a myriad of indirect predictors.

Eighth grade students tended to earn higher reading scores when their library media centers:

- ✓ Were open longer hours after school and are open during the summer
- ✓ Had more total staff
- ✓ Were staffed by library media specialists who provide in-service training to teachers
- ✓ Provided access to materials from other libraries via inter-library loan
- ✓ Were visited more often by classes and other groups of students
- ✓ Provided more computers for licensed database access
- ✓ Were linked to more school computers that provided networked access to the library media center catalog and licensed databases

Library media programs in high schools (as in the elementary and middle levels) influenced 10<sup>th</sup> grade reading scores both directly and indirectly. The number of direct and indirect predictors at this level was comparable to the middle school level, despite some differences in the details.

Tenth grade reading scores tended to be higher in high schools whose library media centers:

- ✓ Had more total staff
- ✓ Were staffed by library media specialists who spent more time planning instructional units cooperatively with teachers
- ✓ Provided access to larger collections of periodical subscriptions
- ✓ Were visited more often by classes and other groups of students
- ✓ Provided more computers, both in the library media center and throughout the school, that offered electronic access to information
- ✓ Spent more on library media center print collections and electronic access to information

Findings about indirect effects are summarized below. A strong library media program was one:

- ✓ That was adequately staffed, stocked, and funded
- ✓ Whose staffs were actively involved leaders in their school's teaching and learning enterprise
- ✓ Whose staffs had collegial, collaborative relationships with classroom teachers
- ✓ That embraced networked information technology

The relationship between library media staffing and reading scores was explored for each level. For elementary, middle, and high school levels, there were positive and statistically significant correlations between levels of library staffing and the following: library media staff activities; information resources and technology; and library media expenditures.

### Texas, 2001

The study of Texas elementary, middle/junior high, and high school libraries (Smith 2001) had three objectives:

1. To examine school library resources, services, and use, on the basis of state guidelines and to determine the need to update the standards and guidelines
2. To determine the impact that school libraries have on student performance as measured by the percent of students who meet minimum expectations on the reading portion of the statewide standardized test, the Texas Assessment of Academic Skills Test (TAAS)
3. To highlight library practices in the best performing schools

Overall, the study confirmed higher TAAS performance at all educational levels in schools with librarians than in schools without librarians. In addition, the study maintained that library staffing levels, collection sizes, librarian interaction with teachers and students, and library technology levels had a positive association with TAAS performance at the elementary, middle/junior high and high school levels.

To examine the relationship between library resources and activities, and student performance on TAAS reading, more than 200 library, school, and community variables were statistically analyzed for relevance. Those remaining predictors reflecting library programs, resources, and activities were categorized accordingly:

- ✓ Library program development
- ✓ Leadership activities
- ✓ Teaching/collaboration activities
- ✓ Library technology
- ✓ School technology with access to networked library resources.

Among all levels, nine variables in library program development were identified as having positive and significant correlations with student performance: size of the library staff per 100 students; library staff hours per 100 students; library hours of operation per 100 students; print volumes per student; current newspaper and magazine subscriptions per 100 students; video collection per 100 students; software packages per 100 students; volumes purchased in 1999-2000 per 100 students; and the library's

operational expenditures per student. Equally important for collections was their currency.

Data in the area of leadership comprised two types of activities. Library staff at all three levels reported involvement with a range of school professionals and colleagues through meetings and committees within their respective schools, and also within the profession. Leadership activities with significant positive correlations with student performance included librarians meeting with the principal and other school administrators, attending faculty meetings, serving on the school's curriculum committee, and meeting with colleagues in the district. The leadership activities pursued by library staff at the high school level were similar to the activities at the other two levels, but yielded a higher correlation.

Four roles identified in the area of collaboration emerged at the elementary and middle/junior high school levels with significant but lower correlation with student performance. These included librarians planning instructional units with teachers, teaching cooperatively with teachers, providing training to teachers, and assisting teachers in accessing and using information about state funded programs related to reading. For high schools, in addition to the first three aforementioned activities, three other activities were correlated with student performance – librarians engaged in providing information skills instruction to individuals or groups, identifying materials for instructional units developed by teachers, and serving on curriculum committees – all at significant levels.

Technology was divided into two sub-areas: technology in or under the library's supervision; and school technology that can access library resources. Using the ratio of "per 100 students," six variables were identified as having highly positive and significant correlations with student performance for all three levels. Within the library, these are computers in or under the library's supervision, library computers with Internet access, library computers with access to the library catalog, library computers with access to the library's databases, library computers with CD ROM drives, and library computers with

networked access to CD ROM resources. Seven variables of school technology access to library resources emerged as highly and significantly correlated with student performance: school computers with access to networked library resources; school computers with access to the library catalog; school computers with access to the library's databases; school computers with access to library computers that have CDROM drives; and school computers with access to library's networked CD ROM resources.

### Iowa, 2002

The declining condition of library media programs in Iowa was the incentive for leaders of Iowa Area Education Agencies to document the impact of library media programs in Iowa schools. Their plan was to share the information with school decision makers including school boards, superintendents, principals, teachers, and library media specialists. In addition to verifying the findings of the first Colorado study, the Iowa study (Rodney, Lance, and Hamilton-Pennell 2002) also endeavored to explore several issues that were analyzed in previous state studies. These included:

- ✓ Identifying characteristics of library media specialists and programs that affect achievement
- ✓ Assessing the contribution of collaboration between teachers and library media specialists to the effectiveness of library media programs
- ✓ Examining the growing role of information technology in library media programs, particularly licensed databases and the Internet

On all three counts, the Iowa study was decidedly successful.

Test scores used as indicators of student academic achievement were the 1999-2000 scores on the reading portions of the Iowa Tests for Basic Skills (ITBS) for students in grades 4 and 8 and the Iowa Tests of Educational Development (ITED) for 11<sup>th</sup> graders. Library media predictors of reading scores were determined for the three grade levels.

In promoting high achievement, the success of any library media program depended on the presence of at least one full-time professionally-trained and credentialed library media specialist. At all three grade levels, schools with average or above average staffing levels in this area tended to have average or above average reading scores.

Elementary reading scores tended to be higher for those library media programs that had:

- ✓ More weekly hours of library media specialist staffing (both total and per student)
- ✓ Staff who spent more weekly hours planning and teaching cooperatively with teachers and managing school computer networks
- ✓ Collections that included more volumes per student, more magazine and newspaper subscriptions (both total and per 100 students), and more videos per 100 students
- ✓ Collections containing volumes with more recent copyright dates, especially for reference sources
- ✓ Higher levels of in-library usage of materials

Middle school reading scores tended to be higher when library media centers:

- ✓ Were open longer hours before school
- ✓ Had more weekly hours of library media specialist staffing per student
- ✓ Were used more

In middle schools with higher reading scores, students were more likely to visit the library media center as part of a class or other group, to visit the library media center individually for information skill instruction, and to use library media information resources that may not be available for use outside the library media center.

High school reading scores tended to be higher in schools whose library media centers:

- ✓ Had more weekly hours of library media specialist staffing per student
- ✓ Offered more hours of reading incentive activities for students (both total hours and percent of weekly staff hours)
- ✓ Had larger collections of audio materials, including compact discs and audio cassettes

Across all levels, the one common predictor of reading scores was the level of library media specialist staffing. Levels of library media specialist staffing related to the library media center's hours of operation, the types of activities pursued by library media staff, the information resources and technology made available to students and teachers, and the expenditures on the library media program.

### California, 2002

In June 2002, the former SBC Pacific Bell (currently SBC) conducted a study on school library media centers and school achievement in California (Siminitus 2002). In a commitment to remain responsive to customer needs and provide useful discussion and planning tools for administrators, library media teachers, and their network teams, market researchers solicited the views of district curriculum leaders on top school and school library issues, technology concerns, and academic network applications. Undergirding the research was the acknowledgement that the school curriculum should drive the technology. The district respondents represented about one third of all public school students in the state.

The twenty-five curriculum leaders and, in some cases, district librarians of California's largest districts who participated in the telephone survey tended to agree on the top issues for their district and their school library media centers. Academic achievement was the number one issue district wide, including high schools.

Curriculum leaders reported that inadequate staffing was the top library issue. Lack of



staff resulted in a lack of access to library resources and library media teachers. California school districts were being driven by high stakes testing to improve student academic performance. As a result, school library staffing, programs, information literacy instructions, resource collections, and online tutorials were being looked at in a new light.

## **Conclusions**

The definitively positive impact of school library media programs is eminent and affirmed in the above studies. In the research that addressed school and community differences, the influence of the library media program could not be explained away by school district expenditures per pupil, teacher/pupil ratio, the average years of experience of classroom teachers, and their average salaries; or by adult educational attainment, children in poverty, and racial/ethnic demographics. Vibrant and productive library media programs led by library media specialists who are guided by professional standards and the well substantiated research are poised to make significant contributions to established and emerging educational initiatives committed to *No Child Left Behind*.

## Methodologies

### Sample

This study used a database of 2,138 North Carolina school libraries and 2,529 North Carolina school librarians provided by the state's Department of Public Instruction. We conducted two surveys of this population. The first survey, with a November deadline, consisted of 494 questionnaires mailed to schools selected at random from the database. The second survey, with a January deadline, consisted of 500 questionnaires mailed to schools selected at random from those schools in the database that had previously not received questionnaires.

In the first round of the survey, 113 completed questionnaires were returned. In the second round, 103 completed questionnaires were returned. Thus, the overall return rate for the two rounds was 22 per cent. Table 1 shows the number of questionnaires sent and the number returned for each round of the survey.

**Table 1. Number of questionnaires sent and returned  
for each round of the survey**

Survey	Sent	Returned	Response Rate
1 <sup>st</sup>	494	113	23 %
2 <sup>nd</sup>	500	103	21 %
Total	994	216	22 %

Of the 216 questionnaires returned, 206 could be used.<sup>1</sup> The grade levels represented by these completed questionnaires are shown in Table 2. Not surprisingly, the largest

<sup>1</sup> The number of usable responses provides a margin of error of approximately 6.5 per cent at a confidence level of 95 per cent.

group represented elementary schools, which make up nearly half of North Carolina's public schools.

**Table 2. Grade levels represented by the completed questionnaires**

Level	Number	Percentage
Combined	12	5.8 %
Elementary	101	49.0 %
Middle	46	22.3 %
High	47	22.8 %
Total	206	100.0 %

In addition to the information gathered in the questionnaires, we also obtained student achievement scores for the responding schools. Student achievement was defined as the percentage of students in an individual school who scored at or above achievement level III on either the end-of-grade composite reading exam (for elementary and middle schools) or the end-of-course English I exam (for high schools). These exams were selected because of their comparability with the student achievement data used in previous studies. The data were available on the Web at URL: <http://www.ncpublicschools.org/vol2/rsds2002/index.html>.

## Survey

The survey instrument used in this study was based on the questionnaire used in a study of Pennsylvania school library media centers by Keith Curry Lance and Marcia J. Rodney of the Library Research Service of the Colorado Department of Education in their studies (Lance, Rodney, and Hamilton-Pennell 2000b). The survey instrument is included as Appendix A of this report.

The questionnaire was designed to collect data on school library media programs in North Carolina in eight areas: staff activities; service hours; library usage; library technology; Internet access; operating expenditures; management; and school demographics.

*Respondent Information.* The questionnaire began with several items identifying the responding School – its name; its level (Elementary, Jr High/Middle, High, or Combined); the grades in the school; and the name and title of the respondent. (We did guarantee the anonymity of respondents and noted that identification was requested for clarification and follow-up purposes only and that the report would not identify any schools and individuals.)

*Selected Paid School Library Staff Activities in a Typical Week.* Previous studies had found evidence for the importance of the school librarian's in performing tasks associated with learning and teaching as well as tasks associated with information access and delivery. The questionnaire incorporated a comprehensive list of staff activities, which included the hours per typical week staff spent:

- ✓ Planning instructional units with teachers
- ✓ Teaching cooperatively with teachers
- ✓ Providing in-service training to teachers and/or other school staff
- ✓ Meeting with building or district standards committees/teams/task forces
- ✓ Serving on building or district curriculum committees
- ✓ Assisting teachers (individually or in groups) in accessing and/or utilizing standards-related information
- ✓ Identifying materials for instructional units developed by teachers
- ✓ Providing information skills instruction to individuals or groups (e.g., citations, copyright/plagiarism, critical thinking, evaluating Internet sources, note-taking)
- ✓ Offering reading incentive activities (e.g., reader's advisory services, book talks, story times, author visits, puppet shows)

- ✓ Performing basic library functions (e.g., processing, retrieving, checking in and out, re-shelving/re-storing materials/equipment)

This information was sought in order to obtain more specific insight about which tasks performed by school librarians were more likely to affect how students perform on achievement tests.

*School Library Staffing in a Typical Week.* One of the questions examined by the study was the value of staffing school libraries with individuals possessing Master's and bachelor's degrees or higher. This question was motivated by one of the most consistent findings of previous research, the value of staffing them with individuals who are professionally trained for the job. Consequently, this part of the questionnaire requested the number of individuals and the total number of person-hours worked by paid staff with different degrees – Master's or higher, Bachelor's, and all other staff.

*Services Hours in a Typical Week.* The fourth part of the questionnaire contained items concerning the school library's hours of operations – before, during, and after school as well as during the summer months. Based on previous research, it seemed reasonable to expect that schools with higher test scores would be those with libraries that have longer hours.

*School Library Usage in a Typical Week.* The next part of the questionnaire solicited data about how often students, teachers, administrators, parents, and others used the school library for different purposes:

- ✓ Visits to the school library (scheduled or unscheduled) by individuals
- ✓ Visits to the school library (scheduled or unscheduled) by classes or other groups
- ✓ Information skills instruction contacts (scheduled or unscheduled) with individuals
- ✓ Information skills instruction contacts (scheduled or unscheduled) with classes or other groups

- ✓ Circulation of materials
- ✓ In-library use of materials
- ✓ Intra-district loans - items provided to other buildings
- ✓ Intra-district loans - items received from other buildings and district collections

This information was sought in order to obtain more specific insight about which uses of the school library were more likely to affect how students perform on achievement 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 the number of computers both in or under the supervision of the school library as well as the number of computers located elsewhere in the school but from which networked library resources could be accessed. For these computers, respondents were further asked to identify how many:

- ✓ Had Internet connections
- ✓ Were on a local area network
- ✓ Had access to the school library catalog
- ✓ Had access to school library databases (e.g., FirstSearch, SIRS)
- ✓ Had accommodations for persons with disabilities (e.g., voice synthesizer, magnified screen)

In addition, respondents were asked whether the library had an automated circulation system and, if so, the name of the vendor or system.

The purpose of these questions was to help determine the extent to which schools with higher test scores would be those with libraries that have access to more technology.

*Internet Access for Students.* The increasing importance of the Internet and recent controversies surrounding the filtering of Internet terminals led us to include a series of

questions about Internet access for students in the school libraries. Respondents were asked to note:

- ✓ Whether there were no restrictions on Internet access
- ✓ Whether access was available with parental permission and/or an acceptable use statement
- ✓ Whether there were any grade restrictions or other restrictions on Internet access
- ✓ Whether Internet access was available via a preselected menu only
- ✓ Whether student terminals were filtered
- ✓ The level at which the decision was made to filter student terminals, if any were filtered

This information was sought in order to determine whether the ways in which Internet access is provided had any impact on how students perform on achievement tests.

*School Library Collection.* Because previous research had suggested that schools with higher test scores would be those with libraries that have larger collections of materials or access to online or electronic resources, this section of the questionnaire asked for the number of items in the school library collection by various formats – print volumes, encyclopedias and reference titles on CD-ROM or laser disk, current print subscriptions to magazines, current print subscriptions to newspapers, video materials (both cassettes and disks), and computer software packages for use in school library by students. The questionnaires also asked whether the library subscribed to online periodical services (e.g., FirstSearch, InfoTrac, UMI) or to CD ROM services (e.g., SIRS, Gale’s “Discovering...” series, NewsBank, SuperTOM) or to other electronic full text services (e.g., E-library). The questionnaire also asked whether the school library provided access to NC Wise Owl, the state Department of Public Instruction’s Web site, featuring access to licensed databases.

Finally, the questionnaire asked for the average age of the school library’s collection, based on copyright year, a question motivated by the idea that a larger collection is not

necessarily a better collection, especially if it consists increasingly of deteriorating volumes of obsolete information.

*Annual Operating Expenditures.* In order to determine whether the amount of money expended by school libraries in various areas would have an impact on student achievement, the questionnaire included questions on operating expenditures for books and all other print materials, materials in electronic formats, non-print materials, electronic access to information, and equipment. The survey asked respondents to include funds allocated in the school's budget as well as those from other sources.

*School Library Information Management.* Part 10 of the questionnaire gathered information about various aspects of the management of the school library:

- ✓ Whether the library has an advisory committee
- ✓ Whether the school library's staff meet regularly with their public library counterparts
- ✓ Whether any challenges or requests for reconsideration of materials have been received during the past year
- ✓ Whether the library has a selection policy
- ✓ Whether the library allow unscheduled visits as needed by students (i.e., whether the library has a "flexible schedule")

Again, this information was collected to determine whether the ways in which school libraries are managed have an impact on student achievement

*School Demographics.* Three questions about the school's demographics were also included – number of students, percentage of students who qualified for federal free and reduced school lunches, and whether the school was on a year-round schedule.



## Findings

Consistent with the studies outlined above in the literature review, this report found that school library programs in North Carolina elementary, middle school, and high schools have a significant impact on student achievement – as measured by scores on standardized reading and English tests.

We began the analysis of each variable's impact on student achievement by computing the value of Pearson's correlation coefficient between the variable and student achievement, as measured by the percentage of students in our responding schools who scored at or above achievement level III on either the end-of-grade composite reading exam (for elementary and middle schools) or the end-of-course English I exam (for high schools).

When we determined that a statistically significant correlation existed between a variable and student achievement, we then sought corroborating evidence for the link by comparing high-performing schools (those with higher average scores on standardized reading and English tests) and low-performing schools (those with lower average scores on standardized reading and English tests) to determine whether a statistically significant difference could be found for the variable in question. We also considered whether schools that ranked highest on the variable had significantly higher student achievement than schools that ranked lowest on the variable.

### Student Achievement

In order to compare high-performing schools and low-performing schools on the variables of interest, we identified the high-performing schools and the low-performing schools among those that responded to our survey in the following manner.<sup>2</sup>

---

<sup>2</sup> We omitted combined schools because of the difficulties involved in determining student achievement scores for these schools. For example, in the case of a combined middle and high school, both end-of-grade composite reading exam (for elementary and middle schools) or the end-of-course English I exam (for high schools) would be taken by students at the school. Weighted scores would have been difficult to

High-performing schools were defined as those in the top one-third in student achievement for all schools at that grade level – i.e., elementary, middle, and high school. As noted earlier, student achievement was defined as student performance on the end-of-grade composite reading exam for elementary and middle schools and as student performance on the end-of-course English I exam for high schools. The cut-off points for each grade level and the number of high-performing and low-performing schools at each grade level are shown in Table 3.

**Table 3. High-performing and low-performing schools by grade level**

Level	High-Performing Schools		Low-Performing Schools		Total Number
	Student Achievement Scores	Number	Student Achievement Scores	Number	
Elementary	86.6 % or above	33	78.5 % or below	33	66
Middle	83.8 % or above	15	73.5 % or below	15	30
High	77.4 % or above	15	64.4 % or below	15	30

Table 4 shows the percentage of students at or above Level III on standardized tests in the high-performing schools and in the low-performing schools. The gap between the average high-performing school and the average low-performing school is statistically significant.

---

compute and potentially misleading.

**Table 4. Comparison of high-performing and low-performing schools by grade level by percentage of students at or above Level III on standardized tests**

Measure	High-Performing Schools	Low-Performing Schools
Percentage of students at or above Level III on standardized tests *	87.9 % (N = 63)	66.1 % (N = 63)

\* Statistically significant difference,  $p = 0.000$

### Library Staffing

One of the most consistent findings in previous studies of the impact of school libraries on student achievement is the relationship between library staffing and student achievement. (Lance, Hamilton-Pennell, and Rodney 2000; Lance, Rodney, and Hamilton-Pennell 2000a, 2000b, 2001; Rodney, Lance, and Hamilton-Pennell 2002; Smith 2001) As school library staffing increases, student achievement tends to increase as well.

The current study confirmed a similar relationship between school library staffing and student achievement in North Carolina public schools. A statistically significant correlation (Pearson  $r = 0.272$ ,  $p = 0.001$ ,  $N = 152$ ) was found between the total paid school library staff hours in a typical week and student achievement.<sup>3</sup> Student achievement tended to increase as the total paid school library staff hours increased.

The current study revealed further evidence of this link by showing that the school libraries in the high-performing schools had more total paid school library staff hours in

<sup>3</sup> In order to use bivariate correlations for all three school levels, we used z scores to standardize the measure of student achievement, because the percentage of students at or above Level III on standardized tests varied widely according to school level. For example, the mean percentage of students at or above Level III on standardized tests was 81.5 per cent for elementary schools ( $N = 100$ ), 77.7 per cent for middle schools ( $N = 46$ ), and 70.4 per cent for high schools ( $N = 46$ ). An average middle school or high school, in other words, would have a student achievement score that was equivalent to a low-performing elementary school.

a typical week than those in the low-performing schools. The libraries in the high-performing schools had a third as many staff hours as did those in the low-performing schools. (See Table 5.) The difference between total paid school library staff hours was 18.6 hours or slightly less than a half-time position.

**Table 5. Comparison of high-performing and low-performing schools by total paid school library staff hours**

Measure	High-Performing Schools	Low-Performing Schools
Total Paid School Library Staff Hours *	83.2 (N = 50)	64.6 (N = 48)

\* Statistically significant difference,  $p = 0.003$

The impact of library staffing on student achievement can also be seen by comparing the schools where the libraries had more staff hours and those where the libraries had fewer staff hours.<sup>4</sup> Table 6 shows the percentage of students at or above Level III on standardized tests in the schools with more staff hours and in the schools with fewer staff hours. The average percentage of students at or above Level III was 6.8 percentage points higher for the “more staff hours” schools than for the “fewer staff hours” schools – a gap that is statistically significant.

<sup>4</sup> As with student achievement, we divided the schools into categories at the different grade levels, so that we could contrast the top one-third with the bottom one-third in paid school library staff hours in a typical week. On this variable, 30 elementary school libraries reported more than 72.5 paid school library staff hours per week; 30 reported fewer than 56.5 staff hours per week. For middle schools, 9 reported more than 80 staff hour per week; 9 reported fewer than 60 staff hours per week. For high schools, 12 reported more than 117.5 staff hours per week; 12 reported fewer than 82.5 staff hours per week. Thus, 51 school libraries were in the “more staff hours” category, and 51 were in the “fewer staff hours” category.

**Table 6. Comparison of “more staff hours” and “fewer staff hours” schools by percentage of students at or above Level III on standardized tests**

Measure	“More Staff Hours” Schools	“Fewer Staff Hours” Schools
Percentage of students at or above Level III on standardized tests *	82.0 % (N = 51)	75.2 % (N = 50)

\* Statistically significant difference,  $p = 0.002$

Another way in which the impact can be seen is in the fact that 24 of the 51 “more staff hours” schools were also high-performing schools (47 per cent) while only 12 of the 51 “fewer staff hours” schools were high-performing schools (24 per cent). This difference is statistically significant (Chi-square = 6.182,  $p = 0.013$ ).

**Table 7. Comparison of high-performing and low-performing schools by total paid school library staff hours**

Measure	High-Performing Schools	Low-Performing Schools
Total Paid School Library Staff Hours – Master’s Degree or Higher *	54.9 (N = 54)	45.6 (N = 56)
Total Paid School Library Staff Hours – Neither Master’s nor Bachelor’s Degree **	34.2 (N = 36)	27.4 (N = 34)

\* Statistically significant difference,  $p = 0.023$

\*\* Statistically significant difference,  $p = 0.008$

This relationship between staff hours and student achievement held for both professionally-trained staff, i.e., staff with a master’s degree or higher, and for support

staff, i.e., staff with no college or university degree. As Table 7 above shows, the high-performing schools had almost 10 hours more per week in professional staff hours and almost 7 hours more per week in non-degreed staff hours than did the low-performing schools, both statistically significant differences.

Statistically significant correlations were also found between the number of professional staff hours in a typical week and student achievement (Pearson  $r = 0.194$ ,  $p = 0.012$ ,  $N = 166$ ) and between the number of support staff hours in a typical week and student achievement (Pearson  $r = 0.238$ ,  $p = 0.013$ ,  $N = 109$ ). Again, student achievement tended to increase as the total professional staff hours increased and as the total support staff hours increased.

As expected from the evidence provided by previous studies, adequately staffed school libraries have a positive effect on student achievement.

### **Hours Open**

As was found in several earlier studies (Baughman 2000; Lance, Rodney, and Hamilton-Pennell 2001; Rodney, Lance, and Hamilton-Pennell 2002; Smith 2001), the school libraries in the high-performing schools were also open more hours in a typical school week than were those in the low-performing schools.

A statistically significant correlation (Pearson  $r = 0.196$ ,  $p = 0.008$ ,  $N = 185$ ) was found between the school library hours open in a typical week and student achievement. Student achievement tended to increase as the number of hours that the school library was open increased.

Table 8 confirms this relationship by showing the average hours open during a typical school week by school libraries in high-performing and low-performing schools. On average, the school libraries in the high-performing schools were open 7.6 hours more per week than were those in the low-performing schools.

**Table 8. Comparison of high-performing and low-performing schools by school library hours open during a typical week**

Measure	High-Performing Schools	Low-Performing Schools
Hours open in a typical school week *	36.3 (N = 62)	28.7 (N = 61)

\* Statistically significant difference,  $p = 0.006$

This contrast can also be seen by comparing the schools where the libraries were open more hours and those where the libraries were open fewer hours.<sup>5</sup> Table 9 shows the percentage of students at or above Level III on standardized tests in the schools with more library hours and in the schools with fewer library hours. The average percentage of students at or above Level III was 4.7 percentage points higher for the “open more hours” schools than for the “open fewer hours” schools – a gap that is statistically significant.

**Table 9. Comparison of “open more hours” and “open fewer hours” schools by percentage of students at or above Level III on standardized tests**

Measure	“Open More Hours” Schools	“Open Fewer Hours” Schools
Percentage of students at or above Level III on standardized tests *	80.7 % (N = 52)	76.0 % (N = 53)

\* Statistically significant difference,  $p = 0.033$

<sup>5</sup> As in the case of staff hours above, we divided the schools into categories at the different grade levels. In the case of hours open in a typical school week, 29 elementary school libraries were open 40 hours per week or more; 30 were open 18 hours per week or less. For middle schools, 12 were open 42.5 hours per week or more; 12 were open 14.5 hours per week or less. For high schools, 11 were open 45 hours per week or more; 11 were open 37.5 hours per week or less. Thus, 52 school libraries were in the “open

Finally, the contrast can be seen in the fact that 25 of the 52 “open more hours” schools were also high-performing schools (48 per cent) while only 12 of the 53 “open fewer hours” schools were high-performing schools (23 per cent). This difference is statistically significant (Chi-square = 7.441,  $p = 0.006$ ).

School libraries that are open more hours provide more opportunities for students to make use of them. It is not surprising that if school libraries have a positive effect on student achievement in general, then those in high-performing schools would be open more than those in schools where student achievement is lower.

### **Collection Age**

The school libraries in the high-performing schools had newer books than did those in the low-performing schools. This finding was consistent with earlier studies. (Rodney, Lance, and Hamilton-Pennell 2002; Smith 2001)

Respondents were asked to provide the average copyright year of the collection, and this information reflects the average age of the collection. A statistically significant correlation (Pearson  $r = 0.203$ ,  $p = 0.007$ ) was found between the average copyright year of the collection and student achievement. Student achievement tended to increase as the average copyright year of the school library collection increases. In other words, student achievement tended to be higher when the school’s library had a newer collection.

Table 10 shows the results of the comparison between the high-performing and low-performing schools, which confirms the relationship. The books in the school libraries in the high-performing schools were 2.4 years newer than the books in the school libraries in the low-performing schools.

---

more hours” category, and 53 were in the “open fewer hours” category.



**Table 10. Comparison of high-performing and low-performing schools by average copyright year of the collection**

Measure	High-Performing Schools	Low-Performing Schools
Average copyright year of the collection (i.e., average age of the collection) *	1988.0 (N = 59)	1985.6 (N = 58)

\* Statistically significant difference,  $p = 0.018$

The impact of average age of the collection on student achievement can also be seen by comparing the schools with the newest collections and those with the oldest collections.<sup>6</sup> Table 11 shows the percentage of students at or above Level III on standardized tests in the schools with the newer collections and in the schools with the older collections. The average percentage of students at or above Level III was 4.5 percentage points higher for the “newer collection” schools than for the “older collection” schools – a gap that is statistically significant.

Finally, the contrast can be seen in the fact that 25 of the 63 “newer collection” schools were also high-performing schools (40 per cent) while only 18 of the 65 “older collection” schools were high-performing schools (28 per cent). While this difference is not statistically significant (Chi-square = 2.062,  $p = 0.151$ ), it does reinforce the pattern seen in Table 10 and Table 11.

<sup>6</sup> Again, we divided the schools into categories at the different grade levels. In the case of average copyright date of the school library collection, 34 elementary school libraries had average copyright dates of 1989 or later; 34 had average copyright dates of 1986 or earlier. For middle schools, 15 school libraries had average copyright dates of 1990 or later; 18 had average copyright dates of 1985 or earlier. For high schools, 14 school libraries had average copyright dates of 1989 or later; 13 had average copyright dates of 1980 or earlier. Thus, 63 school libraries were in the “newer collection” category, and 65 were in the “older collection” category.

**Table 11. Comparison of “newer collection” and “older collection” schools by percentage of students at or above Level III on standardized tests**

Measure	“Newer Collection” Schools	“Older Collection” Schools
Percentage of students at or above Level III on standardized tests *	79.7 % (N = 62)	75.2 % (N = 64)

\* Statistically significant difference,  $p = 0.024$

### Operating Expenditures

The survey gathered information on the school library’s annual operating expenditures in several areas:

- ✓ Books and all other print materials (include magazines & newspapers)
- ✓ Materials in electronic formats (e.g., software, CD-ROM, laser disk, locally-mounted databases)
- ✓ Non-print materials (e.g., audio, video, microform)
- ✓ Electronic access to information (e.g., online database searching, Internet access)
- ✓ Equipment (e.g., computers, CD-ROM drives, VCRs)

We computed the operating expenditures in each of the above categories and the total operating expenditures per 100 students enrolled in each school. The survey asked the libraries to distinguish between funds from the school budget and funds from all other sources, and we examined funds from the school budget, funds from all other sources, and funds from all sources.

Operating expenditures for the school library had an impact on student achievement in two areas: expenditures on books and other print materials; and expenditures on

electronic access to information (e.g., online database searching, Internet access).

### Books and Other Print Materials

The current study found evidence that student achievement tended to increase as the amount of money spent on books and other print materials from the school budget increased. The survey gathered information on the annual operating expenditures on books and all other print materials (including magazines and newspapers), and we computed this figure per 100 students enrolled in each school.

A statistically significant correlation (Pearson  $r = 0.196$ ,  $p = 0.008$ ,  $N = 185$ ) was found between the annual expenditures per 100 students on books and other print materials from the school budget and student achievement. Student achievement tended to increase as the amount of money spent on books and other print materials increased.

Corroboration for this relationship was not as strong as that seen for previous variables, however. Evidence to support the correlation was not statistically significant, although it was strong and consistent with the link between the amount of money spent on books and other print materials and student achievement.

For example, the libraries in the high-performing schools spent over 25 per cent more money on books and print materials per 100 students than those in the low-performing schools.<sup>7</sup> (See Table 12.) This finding is not statistically significant but is nevertheless consistent with the significant correlation found above, which suggests that student achievement increases as the amount of money spent on books and other print materials increases.

---

<sup>7</sup> This analysis includes only schools that reported some non-zero amount of expenditure on books and other print materials. If schools that reported expenditures of zero are included, the difference between the high-performing and the low-performing schools is even greater. In that case, the average expenditure for the high-performing schools was \$1,051 ( $N = 54$ ), compared to only \$796 for the low-performing schools ( $N = 57$ ). Nevertheless, the difference is still not statistically significant,  $p = 0.055$ .

**Table 12. Comparison of high-performing and low-performing schools by annual operating expenditures on books and other print materials**

Measure	High-Performing Schools	Low-Performing Schools
Annual operating expenditures on books and all other print materials (including magazines & newspapers) – School budget – Per 100 students *	\$ 1,051 (N = 54)	\$825 (N = 55)

\*  $p = 0.088$

A comparison of the schools with the greatest annual operating expenditures on books and all other print materials per 100 students (“larger book budget” schools) and those with the least expenditures on books and all other print materials per 100 students (“smaller book budget” schools) reveals a similar pattern.<sup>8</sup> Table 13 shows that the average percentage of students at or above Level III was 3.7 percentage points higher for the “larger book budget” schools than for the “smaller book budget” schools. While this difference is not statistically significant, it is consistent with the findings presented above.

In addition, 21 of the 54 “larger book budget” schools were also high-performing schools (39 per cent) while only 17 of the 54 “smaller book budget” schools were high-performing schools (31 per cent). While this difference appears to be small and is not statistically significant (Chi-square = 0.650,  $p = 0.420$ ), a greater contrast can be seen in the fact that only 12 of the 54 “larger book budget” schools were also low-performing schools (22 per cent) while 21 of the 54 “smaller book budget” schools were low-performing schools (39 per cent). This difference is not statistically significant either

<sup>8</sup> In the case of annual operating expenditures on books and all other print materials per 100 students, 27 elementary school libraries had expenditures per 100 students of \$1,107 or more; 27 had expenditures per 100 students of \$575 or less. For middle schools, 14 school libraries had expenditures per 100 students of \$1,170 or more; 14 had expenditures per 100 students of \$640 or less. For high schools, 13 school libraries had expenditures per 100 students of \$980 or more; 13 had expenditures per 100 students of \$620 or less. Thus, 54 school libraries were in the “larger book budget” category, and 54

(Chi-square = 3.535,  $p = 0.060$ ) but does suggest that the effect of a larger book budget may be preventative, i.e., a larger book budget reduces the likelihood that a school will be low performing even if it does less to guarantee that a school will be high performing.

**Table 13. Comparison of “larger book budget” and “smaller book budget” schools by percentage of students at or above Level III on standardized tests**

Measure	“Larger Book Budget” Schools	“Smaller Book Budget” Schools
Percentage of students at or above Level III on standardized tests *	80.2 % (N = 54)	76.5 % (N = 53)

\*  $p = 0.094$

The finding that increased expenditures for books and other print materials are associated with increases in student achievement appears to be linked to the earlier finding that student achievement is tied to the average age of the collections in the school library. The libraries in the high-performing schools spent over 25 per cent more money on books and print materials per 100 students than those in the low-performing schools, which resulted in book collections that were 2.4 years newer than those in the low-performing schools.

#### Electronic Access to Information

A second statistically significant difference in the budget data involved spending on electronic access to information, e.g., online database searching and Internet access. Spending school funds on the library media program had a significant impact on student achievement in the area of electronic access to information.

---

were in the “smaller book budget” category.

A statistically significant correlation (Pearson  $r = 0.405$ ,  $p = 0.029$ ,  $N = 29$ ) was found between expenditures per 100 students from the school budget on electronic access to information and student achievement. Student achievement tended to increase as expenditures per 100 students on electronic access to information increased.

**Table 14. Comparison of high-performing and low-performing schools by annual operating expenditures on electronic access to information**

Measure	High-Performing Schools	Low-Performing Schools
Annual operating expenditures on electronic access to information (e.g., online database searching, Internet access) – School budget – Per 100 students *	\$ 270 (N = 14)	\$ 109 (N = 6)

\* Statistically significant difference,  $p = 0.035$

Here, the corroborating evidence was quite strong. The school libraries in the high-performing schools spent over two and a half times as much money per 100 students on electronic access to information (e.g., online database searching, Internet access) than did those in the low-performing schools.<sup>9</sup> (See Table 14.)

Likewise, as Table 15 shows, the schools with higher expenditures per 100 students on electronic access to information (“more electronic access” schools) also averaged a higher percentage of students at or above Level III on standardized tests than did the schools with lower expenditures per 100 students on electronic access to information

<sup>9</sup> This analysis includes only schools that reported some non-zero amount of expenditure on electronic access to information. If schools that reported expenditures of zero are included, the difference between the high-performing and the low-performing schools is even greater. In that case, the average expenditure for the high-performing schools was \$102 ( $N = 37$ ), compared to only \$17 for the low-performing schools ( $N = 38$ ). The difference is statistically significant,  $p = 0.010$ .

(“less electronic access” schools).<sup>10</sup> The average percentage of students at or above Level III was 5.5 percentage points higher for the schools with “more electronic access” than for those with “less electronic access.” While this difference is not statistically significant, it is consistent with the findings presented in Table 14.

**Table 15. Comparison of “more electronic access” and “less electronic access” schools by percentage of students at or above Level III on standardized tests**

Measure	“More Electronic Access” Schools	“Less Electronic Access” Schools
Percentage of students at or above Level III on standardized tests *	80.7 % (N = 8)	75.2 % (N = 8)

\*  $p = 0.385$

The findings are further supported by noting that 6 of the 8 “more electronic access” schools were also high-performing schools (75 per cent) while only 2 of the 8 “less electronic access” schools were high-performing schools (25 per cent). This difference is statistically significant (Chi-square = 4.000,  $p = 0.046$ ).

Given the growing importance of online database searching and Internet access to resources to support the school curricula, it is not surprising that school library expenditures on electronic access to information would have a significant impact on student achievement.

<sup>10</sup> We divided the schools into categories at the different grade levels as follows for annual operating expenditures on electronic access to information per 100 students: 2 elementary school libraries had expenditures per 100 students of \$190 or more, and 2 had expenditures per 100 students of \$100 or less; 2 middle school libraries had expenditures per 100 students of \$130 or more, and 2 had expenditures per 100 students of \$120 or less; and 4 high schools had expenditures per 100 students of \$270 or more, and 4 had expenditures per 100 students of \$50 or less. Thus, 8 school libraries were in the “more electronic access” category, and 8 were in the “less electronic access” category.

## Online Periodical Services

The school libraries in the high-performing schools were also twice as likely to subscribe to online periodical services as were those in the low-performing schools.

The questionnaire asked respondents whether they subscribed to any online periodical services (for example, FirstSearch, InfoTrac, and UMI). As Table 16 shows, 27 of 60 libraries in high-performing schools (45 per cent) reported that they did subscribe to such services, while only 13 of 59 libraries in low performing schools (22 per cent) reported that they did.

**Table 16. Comparison of high-performing and low-performing schools by percentage of libraries subscribing to online periodical services**

Measure	High-Performing Schools	Low-Performing Schools
Does the school library subscribe to any online periodical services (e.g., FirstSearch, InfoTrac, UMI)? *	45.0 % (N = 60)	22.0 % (N = 59)

\* Statistically significant difference,  $p = 0.008$

The average percentage of students at or above Level III was slightly – but not significantly – higher for the schools whose libraries subscribed to an online periodical service than for those whose libraries did not (see Table 17). Nevertheless, 27 of the 56 schools (48 per cent) whose libraries subscribed to an online periodical service were also high performing schools, while only 33 of the 139 schools (24 per cent) whose libraries did not subscribe to an online periodical service were high performing schools. This latter difference is statistically significant (Chi-square = 11.224,  $p = 0.001$ ).



**Table 17. Comparison of schools with online periodical services and those without by percentage of students at or above Level III on standardized tests**

Measure	With Online Periodical Services	Without Online Periodical Services
Percentage of students at or above Level III on standardized tests *	79.2 % (N = 55)	77.4 % (N = 133)

\*  $p = 0.321$

As noted earlier, it is not surprising that the provision of electronic access to information by school libraries – in this case, online periodicals – would have a significant impact on student achievement.

### CD ROM Services

The school libraries in the high-performing schools were also twice as likely to subscribe to CD ROM services as were those in the low-performing schools.

The questionnaire asked respondents whether they subscribed to any CD ROM services (for example, SIRS, Gale's "Discovering..." series, NewsBank, and SuperTOM). As Table 18 shows, 19 of 61 libraries in high-performing schools (31 per cent) reported that they did subscribe to such services, while only 9 of 61 libraries in low performing schools (15 per cent) reported that they did.

Again, the average percentage of students at or above Level III was slightly – but not significantly – higher for the schools whose libraries subscribed to a CD ROM service than for those whose libraries did not (see Table 19). Still, 19 of the 44 schools (43 per cent) whose libraries subscribed to a CD ROM service were also high performing schools, while only 42 of the 156 schools (27 per cent) whose libraries did not subscribe to an online periodical service were high performing schools. This latter difference is

statistically significant (Chi-square = 4.280,  $p = 0.039$ ).

**Table 18. Comparison of high-performing and low-performing schools by percentage of libraries subscribing to CD ROM services**

Measure	High-Performing Schools	Low-Performing Schools
Does the school library subscribe to any CD ROM services (e.g., SIRS, Gale's "Discovering..." series, NewsBank, SuperTOM)? *	31.1 % (N = 61)	14.8 % (N = 61)

\* Statistically significant difference,  $p = 0.031$

**Table 19. Comparison of schools with CD ROM services and those without by percentage of students at or above Level III on standardized tests**

Measure	With CD ROM Services	Without CD ROM Services
Percentage of students at or above Level III on standardized tests *	78.9 % (N = 44)	77.6 % (N = 149)

\*  $p = 0.477$

As with the other forms of electronic access to information noted earlier, the provision of CD ROM services by school libraries has a significant impact on student achievement.

## Conclusions

School library programs in North Carolina elementary, middle school, and high schools have a significant impact on student achievement – as measured by scores on standardized reading and English tests.

Scores on standardized reading and English tests in the schools included in this study tended to increase when libraries in the schools:

- ✓ Were staffed more hours during the school week
- ✓ Were open more hours during the school week
- ✓ Had newer books
- ✓ Spent more money per 100 students on books and other print materials like magazines and newspapers
- ✓ Spent more money per 100 students on electronic access to information (e.g., online database searching, Internet access)
- ✓ Were more likely to subscribe to online periodical services
- ✓ Were more likely to subscribe to CD ROM services

These findings are consistent with those of earlier studies in Alaska, Iowa, Colorado, Pennsylvania, and Texas, all of which found similar links between student achievement and the quality of school library programs.

Through legislation such as the School-based Management and Accountability Act of 1996, North Carolina's General Assembly has emphasized public school accountability by rewarding schools for growth in student achievement and for overall percentages of students performing at or above grade level. The results of the survey reported here indicate that one highly effective way of improving student achievement in North Carolina's schools is to provide the school libraries with adequate staffing and adequate funding.

Consequently, the authors of the report make the following recommendations:

1. That funding for school library personnel be increased. A statistically significant correlation was found between the total paid school library staff hours in a typical week and student achievement. The mean number of paid school library staff hours for the high-performing schools in the survey reported here was 83.2 hours per week. The mean number of paid school library staff hours for the low-performing schools was just 64.6 hours per week, almost 25 per cent fewer hours per week than the high-performing schools.
2. That school libraries be open more hours during the school week. A statistically significant correlation was found between the school library hours open in a typical week and student achievement. The high-performing schools in this study were open an average of 36.3 hours per week. By contrast, the low-performing schools were open an average of only 28.7 hours per week, over 20 per cent fewer hours per week.
3. That funding for books and other print materials be increased so that the average age of the collections in school libraries can be improved. (In this respect, that State Library of North Carolina's federally-funded School Library Collection Development Grants provide much-needed assistance.) Statistically significant correlations were found between the average copyright year of the collection and student achievement and between the annual expenditures per 100 students on books and other print materials from the school budget and student achievement. The libraries in the high-performing schools spent over 25 per cent more money on books and print materials per 100 students than those in the low-performing schools. The book collections in the libraries of the high-performing schools were 2.4 years newer than those in the low-performing schools.
4. That funding for electronic access to information, online periodical services, and CD ROM services in particular be increased. A statistically significant correlation was found between expenditures per 100 students from the school budget on electronic access to information and student achievement. The libraries in the high-performing schools spent over two and a half times as much money per 100

students on electronic access to information as those in the low-performing schools, were twice as likely as those in low-performing schools to subscribe to online periodical services, and were also twice as likely to subscribe to CD ROM services as were those in the low-performing schools.

## Works Cited

American Association of School Librarians. (1988) *Information Power: Guidelines for School Library Media Programs*. Chicago/Washington, D. C.: American Library Association; Association for Educational Communications and Technology.

American Association of School Librarians (1998). *Information Literacy Standards for Student Learning*. Chicago: American Library Association.

American Association of School Librarians (1998). *Information Power: Building Partnerships for Learning*. Chicago: American Library Association.

Baughman, James C. (2000). *School Libraries and MCAS Scores*. Unpublished paper presented at a symposium sponsored by Simmons College Graduate School of Library and Information Science. URL: <http://artemis.simmons.edu/~baughman/mcas-schoollibraries/>.

Lance, Keith Curry, Christine Hamilton-Pennell, and Marcia J. Rodney. (2000). *Information Empowered: The School Librarian as an Agent of Academic Achievement in Alaska Schools*. Rev. ed. Juneau, AK: Alaska State Library.

Lance, Keith Curry, Marcia J. Rodney, and Christine Hamilton-Pennell. (2000a) *How School Librarians Help Kids Achieve Standards: The Second Colorado Study*. Denver, CO: Colorado State Library.

Lance, Keith Curry, Marcia J. Rodney, and Christine Hamilton-Pennell. (2000b) *Measuring Up to Standards: The Impact of School Library Programs & Information Literacy in Pennsylvania Schools*. Greensburg, PA: Pennsylvania Citizens for Better Libraries.

Lance, Keith Curry, Marcia J. Rodney, and Christine Hamilton-Pennell (2001). *Good Schools Have School Librarians: Oregon School Librarians Collaborate to Improve Academic Achievement*). Terrebonne, OR: Oregon Educational Media Association.

Lance, Keith Curry, Linda Welborn, and Christine Hamilton-Pennell. (1993) *The Impact of School Library Media Centers on Academic Achievement*. Castle Rock, CO: Hi Willow Research and Publishing.

Rodney, Marcia J., Keith Curry Lance, and, Christine Hamilton-Pennell. *Make the Connection: Quality Library Media Programs Impact Academic Achievement in Iowa* (2002). Bettendorf, IA: Mississippi Bend Area Education Agency / Iowa Area Education Agencies.

Siminitus, Jackie. *California School Library Media Centers and Student Achievement: A Survey of Network Applications* (2002). San Antonio, TX: SBC Pacific Bell. URL: [www.kn.pacbell.com/survey/k12libraries.pdf](http://www.kn.pacbell.com/survey/k12libraries.pdf).

Smith, Ester G. *Texas School Libraries: Standards, Resources, Services, and Students' Performance* (2001) Austin, TX: EGS Research & Consulting.

## **Appendix A**

### **Survey Instrument**



## North Carolina School Library Survey, 2002

<b>PART I – RESPONDENT INFORMATION</b>	
<i>Line</i>	
1	School Name
2	School Level (Circle one)      Elementary      Jr High/Middle      High      Combined
3	Grades in School (circle all that apply)    preK   K   1   2   3   4   5   6   7   8   9   10   11   12
4	Name and Title of Respondent

<b>PART II – SELECTED PAID SCHOOL LIBRARY STAFF ACTIVITIES IN A TYPICAL WEEK</b>		
(A typical week is one with no holidays and one that is not unusually busy or unusually slow.)		
<i>Selected Activities</i>	<i>Line</i>	<i>Contact hours in a typical week</i>
<b>Learning &amp; Teaching</b>		
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	
<b>Information Access &amp; Delivery</b>		
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	
<b>All other paid school library staff hours weekly</b>	11	
<b>TOTAL PAID SCHOOL LIBRARY STAFF HOURS (Sum of lines IV 1-11)</b>	12	

<b>PART III – SCHOOL LIBRARY STAFFING IN A TYPICAL WEEK</b>			
<i>Paid School Library Staff</i>	<i>Line</i>	<i>Number of Persons (Head count, not FTE) (a)</i>	<i>Total Person-Hours in a Typical Week (b)</i>
Master’s degree or higher	1		
Bachelor’s degree	2		
Other paid school library staff	3		
<b>TOTAL PAID SCHOOL LIBRARY STAFF (Sum of lines III 1-3)</b>	4		

<b>PART IV - SERVICE HOURS IN A TYPICAL WEEK</b>		
<i>Item</i>	<i>Line</i>	<i>Hours in a typical week</i>
Hours open in a typical school week – Before school hours	1	
Hours open in a typical school week – During school hours	2	
Hours open in a typical school week – After school hours	3	
Hours open in a typical summer week	4	

<b>PART V - SCHOOL LIBRARY USAGE IN A TYPICAL WEEK</b>		
<i>Type of Usage</i>	<i>Line</i>	<i>Number in a typical week</i>
Visits to the school library (scheduled or unscheduled) by individuals (students, teachers, administrators, parents, others)	1	
Visits to the school library (scheduled or unscheduled) by classes or other groups (e.g., groups of teachers, administrators, parents, or other school visitors)	2	
Information skills instruction contacts (scheduled or unscheduled) with individuals (students, teachers, administrators, parents, others)	3	
Information skills instruction contacts (scheduled or unscheduled) with classes or other groups (e.g., groups of teachers, administrators, parents, or other school visitors)	4	
Circulation of materials (include all formats)	5	
In-library use of materials (estimate based on reshelving count)	6	
Intra-district loans (i.e., loans of materials between one building and another within the same school district, including items obtained from district collections): <ul style="list-style-type: none"> <li>• Items provided to other buildings</li> </ul>	7	
Intra-district loans (i.e., loans of materials between one building and another within the same school district, including items obtained from district collections): <ul style="list-style-type: none"> <li>• Items received from other buildings and district collections</li> </ul>	8	

<b>PART VI - SCHOOL LIBRARY TECHNOLOGY</b>			
		<i>Number of computers in school</i>	
<i>Number of computers in school</i>	<i>Line</i>	<i>Located in or under the supervision of school library (a)</i>	<i>From which any networked library resources may be accessed (b)</i>
With Internet connection	1		
On a local area network (LAN)	2		
With access to the school library catalog	3		
With access to school library databases (e.g., FirstSearch, SIRS)	4		
With any accommodations for persons with disabilities (e.g., voice synthesizer, magnified screen)	5		
TOTAL	6		

Does the school library have an automated circulation system?	7	Yes No
If "Yes," please provide the name of the vendor or system.	8	

<b>PART VII - INTERNET ACCESS FOR STUDENTS</b>					
<i>Conditions of Internet access</i>	<i>Line</i>	<i>Response</i>	<i>Internet filtering</i>	<i>Line</i>	<i>Response</i>
There are no restrictions	1	Yes No	Internet access via pre-selected menu only	5	Yes No
With parental permission and/or acceptable use statement	2	Yes No	Student terminals filtered	6	None Some All
Restricted by grade level (unrestricted from grade ___ up)	3	Yes No	If any student terminals are filtered, at what level is that decision made?	7	District level  Building level
Other restrictions. Please specify:	4	Yes No			

<b>PART VIII - SCHOOL LIBRARY COLLECTION</b>		
<i>Item</i>	<i>Line</i>	<i>Number</i>
Print volumes	1	
Encyclopedias & reference titles on CD-ROM or laser disk	2	
Current print subscriptions to magazines	3	
Current print subscriptions to newspapers	4	
Video materials (cassettes and disks)	5	
Computer software packages for use in school library by students	6	

Does the school library subscribe to any online periodical services (e.g., FirstSearch, InfoTrac, UMI)?	7	Yes No
Does the school library subscribe to any CD ROM services (e.g., SIRS, Gale's "Discovering..." series, NewsBank, SuperTOM)?	8	Yes No
Does the school library subscribe to any other electronic full text services (e.g., E-library)?	9	Yes No
Does the school library provide access to NC Wise Owl?	10	Yes No

Average age (copyright year) of the collection	11	
--	----	--

<b>PART IX – ANNUAL OPERATING EXPENDITURES</b>			
	<i>Line</i>	<i>School Budget (a)</i>	<i>All Other Sources * (b)</i>
Books and all other print materials (include magazines & newspapers)	1		
Materials in electronic formats (e.g., software, CD-ROM, laser disk, locally-mounted databases)	2		
Non-print materials (e.g., audio, video, microform)	3		
Electronic access to information (e.g., online database searching, Internet access)	4		
Equipment (e.g., computers, CD-ROM drives, VCRs)	5		

\* Please identify "All Other Sources" in the space below:

<b>PART X - SCHOOL LIBRARY MANAGEMENT</b>		
	<i>Line</i>	<i>Response</i>
Does the school library program have an advisory committee?	1	Yes No
Do school library staff meet regularly with local public library staff?	2	Yes No
Have there been any challenges (reconsiderations) of materials in your school library's collection during the past year?	3	Yes No
Does the school library have a selection policy?	4	Yes No
Does the school library allow unscheduled visits as needed by students?	5	Yes No

<b>PART XI - SCHOOL DEMOGRAPHICS</b>		
	<i>Line</i>	<i>Response</i>
Number of students in your school (i.e. eligible library users): (Official school enrollment/membership 1 <sup>st</sup> month 2001-2002)	1	
What percentage of students in your school qualified for federal free and reduced school lunches in the 1st Month 2001-2002?	2	%
Is the school on a year-round schedule?	3	Yes No

If you have any comments, please include these in the space below:

If you would like to receive a summary of the findings from this study, please provide an email address below.

---

Thank you for your assistance.

Dr. Pauletta Bracy  
Dr. Robert Burgin

(Based on a Pennsylvania survey conducted by Keith Curry Lance. See <http://www.lrs.org>. Used with permission.)