

# SHOW ME CONNECTION

**HOW SCHOOL LIBRARY MEDIA CENTER SERVICES  
AFFECT STUDENT ACHIEVEMENT**



*A study commissioned by the Missouri Department of Elementary  
and Secondary Education and the Missouri State Library  
and conducted by Quantitative Resources, LLC.*

# INTRODUCTION

## Show Me Connection: How School Library Media Center Services Affect Student Achievement

**S**tudent achievement and test scores rank high on every school district's priority list, and superintendents and school boards must be able to measure the impact of school services on that achievement. If any services actually help students learn more, then district officials can concentrate on those services to provide the best education possible for students.

The Missouri Department of Elementary and Secondary Education and the Missouri State Library chose to analyze school library media center services and to study their effect on student achievement. The agencies contracted with Quantitative Resources (now RQ Squared) to study how library media center services affect achievement, specifically on Missouri Assessment Program (MAP) test scores. A multi-dimensional study was conducted to test the following three hypotheses:

1. Schools with library media centers and services display a positive relationship to student achievement measured using the weighted average MAP index (WAMI).
2. Certain components of school library media centers and services have more of a relationship to the WAMI than others.
3. Although demographic characteristics have a high relationship to the WAMI, they do not eliminate the positive relationships from hypothesis one and two.

School library media centers and services account for 10.6 percent of the variation in student achievement as measured by the MAP. More specifically, library usage, summer reading programs, and library access have the most effect on student achievement. Implementing the three components requires the human "touch" of the school library media specialist.



**“School library media centers and services account for 10.6 percent of the variation in student achievement as measured by the MAP.”**

# DATA COLLECTION

## Core Data

The Show Me Connection: How School Library Media Center Services Affect Student Achievement research was conducted using a variety of research methodologies. The Missouri Department of Elementary and Secondary Education provided a vast amount of school building level data, known as “core data.” The following is a list of core data that served as an integral part of the analysis:

- student data
- teacher/administrator data
- library media data
- technology data
- librarian data

## Questionnaire

The questionnaire of school library media center services focused on several areas that could have an effect on student achievement. All school library media centers in Missouri were asked to participate in a Web-based questionnaire. The 47 questions asked were developed because:

- the data elements were not included in the core data collection,
- the school library assessments of other states asked similar questions so they were needed for comparison purposes, and/or
- the data elements were not available from other sources.

The categories of questions included:

- library management
- library staff
- service hours
- staff activities
- library/loan use
- library technology
- library collection

## Creating a Data Sample

The database for the sample was created by identifying the schools with complete core data records and a complete library media specialist questionnaire. There were 241 schools with complete data that could be used as variables for the 11 components in the final analysis. Although more than 241 complete cases were desired, especially after 782 school buildings completed the questionnaire, the 241 cases still allow the analysis to be statistically valid and reliable at a 95 percent confidence interval, at plus or minus 5.6 percent. In addition, the 241 complete cases exceeded the number of cases used in any other state’s study.



## Compiling the Data

The core data and questionnaire data were aggregated into the following components:

- librarian qualifications
- library access
- library budget
- library space
- library staff activities
- library usage
- library management
- library media center holdings
- library staffing
- summer reading program
- technology

# DATA ANALYSIS

## Statistical Analysis of the Data

Statistical analyses included identifying the connections between school library media center services and student achievement in the sample data and determining the “significance levels” that indicate the extent to which the sample data represents the entire Missouri student population.

The following types of analyses were completed.

### Hypothesis Testing

The three hypotheses were tested to determine whether school library media center services are positively related to student achievement as measured by the MAP.

### Relationship Testing

Relationship testing included:

- bivariate correlation
- multiple regressions
- partial correlation

## Understanding the Analysis

### Weighted Average MAP Index (WAMI)

The MAP index is calculated by the Missouri Department of Elementary and Secondary Education and is the percent of students at different levels of proficiency in the different core content areas of the statewide MAP standardized test. This index was weighted by the number of reportable students in 2002 who took the test in each school grade and content area. It was necessary to compute the WAMI because the MAP test is not administered to all grades in the same content areas.



### Hypothesis One

The relationship between WAMI and school library media center services was first calculated by combining all 11 of the survey’s components. This analysis determined 12.6 percent of the variance of the WAMI could be explained by school library media center services. The 12.6 percent variance is applicable to all schools in the state, not just the 241 in the study, if the statistical significance is 0.05 or less. The statistical significance in the multiple regression test was 0.003, much less than 0.05.



## Hypothesis Two

The analysis of the data for hypothesis two involved testing each of the 11 library components for its relationship to student achievement as measured by WAMI. Five of the library components showed a statistically significant relationship through the first and second testing.

Components	Relationship	Significant Relationship	Still a relationship if every school's demographics are the same? (External Partial Correlation)	Still a relationship if all of the other LMC components stay the same? (Internal Partial Correlation)
Library Usage	++	Strong	++	++
Summer Reading	+	Strong	+	+
Library Access	+	Yes	+	+
Library Budget	+	Yes	+	0
Technology	+	Yes	+	0

The third test (last column in table above) shows that library budget and technology standing alone lose their relationship to WAMI. Simply having a library budget or technology does not affect WAMI. It is the use of the library budget and the technology which allows library usage, summer reading programs, and library access to happen.

The following three components of school library media center services have a statistically significant impact on student achievement:

- library usage
- summer reading program
- library access



A library media specialist is necessary to create library usage, summer reading programs, and library access, which affect student achievement. Without staff, a library media center is only a warehouse of materials.

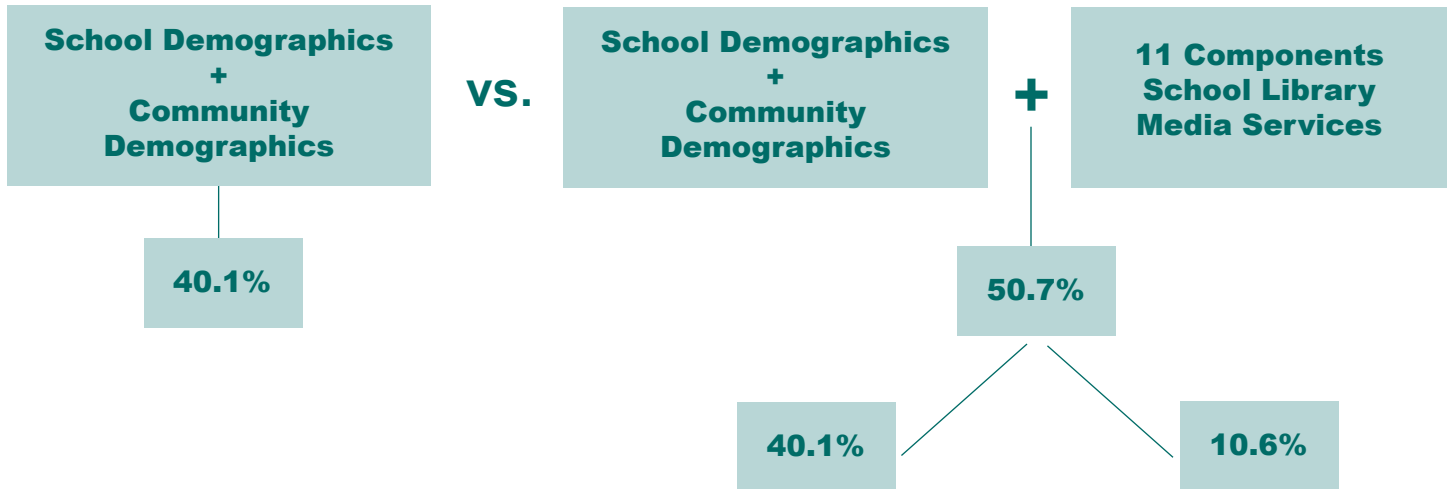
The staff must be:

- in direct contact with students and teachers,
- committed to coordinating their efforts district and region wide, as well as with the local public library,
- readily available to assist students before, during and after school,
- willing to collaborate with classroom teachers and public library personnel to encourage students to read during the summer,
- technologically astute to ensure the library media center has connectivity allowing 24/7 access, and
- leaders who ensure a variety of online and print resources, including an online catalog, are available.

### Hypothesis Three

Although demographic variables have a high relationship to the WAMI, they do not eliminate the positive relationship between school library media center services and student achievement.

Using a more conservative approach, school library media center services explained up to 10.6 percent of the WAMI variance not explained by the demographic variables, community variables, and school variables (see graphic below). This explanation remained intact when applying statistical significance testing; therefore, the finding holds true, not just for the 241 schools in the study but for all schools in Missouri.



# FINDINGS

**T**here is explicit evidence school library media centers and library media specialists affect students and their achievement as measured by the MAP test scores. While this has been a belief of library media specialists for many years, this study provides verification based on data collected from school buildings in the state. No longer is the connection between school library media centers and student achievement an opinion or belief. The connection has been confirmed as a statistically significant, true relationship based on hard data.

In the first phase of the study, it was established that school library media centers and services account for 10.6 percent of the variation in student achievement as measured by MAP test scores. More specifically, three of the 11 library components — library usage, summer reading, and library access — have the most effect on the students and their achievement. The implementation of the three components requires the human “touch” of the school library media specialist. Due to the strong, statistically significant relationship discovered in the three hypotheses, further analysis was conducted to study the three leading components having the strongest relationship to student achievement.



Using the existing data, statistical tests were completed on the three identified library components. One hundred eighty-two hypotheses were tested against the three components to determine their significance. The second phase of the study addressed three questions:

1. what components of library usage cause the relationship to student achievement to be affected,
2. what type of summer reading program is most effective when attempting to affect student achievement, and
3. what must be accessible and what accessibility issues are key to affect student achievement?

To answer these and other questions, additional research and analysis was conducted in late 2003 to determine the most important factors within each component and how the factors can be translated into “action-oriented” steps school library media specialists and districts can take to affect student achievement.

**“No longer is the connection between school library media centers and student achievement an opinion or belief. The connection has been confirmed as a statistically significant, true relationship based on hard data.”**

## Library Usage

Library usage and its positive relationship to student achievement can best be achieved by:

- ensuring school library media specialists have clerical help (four percent impact), and
- providing many varieties of print and online resources (two percent impact).

## Summer Reading Program

Summer reading programs encourage an interest in reading, enhance the act of reading, and lessen the impact where formal education is suspended for three months. Having a summer reading program positively affects student achievement,

and there is a larger significant impact when school library media centers cooperate with local public libraries (18 percent impact).

## Library Access

Library access and its positive relationship to student achievement can be accomplished by:

- designating a library/media coordinator to manage resource and information sharing (six percent impact), and
- providing many varieties of online resources including an online catalog (22 percent impact).

# CONCLUSION

**Schools with library media centers and services display a 10.6 percent positive relationship to student achievement measured using the WAMI.**

**Three components of school library media centers and services have more of a relationship to the WAMI than others. These are library usage, summer reading programs, and library access.**

**Although demographic characteristics have a high relationship to the WAMI, they do not eliminate the positive relationships from hypothesis one and two.**





# ACTION PLAN

## On the Way to an Action Plan

The school library media center should offer a variety of print and online resources, including an online catalog. This factor affects both library usage and library access, which affect student achievement.

School library media specialists should have clerical help to allow the professional to work directly with students and teachers, as this factor affects library usage, which affects student achievement.

Summer learning loss is real. Spending time reading over the summer has proven effective in reducing this loss. Cooperating with the local public library to provide a summer reading program allows students to read more consistently while simultaneously giving them expanded opportunities to access resources. Summer reading programs impact student achievement.

The school library media center, with a variety of online resources and services including automated library catalog services, has an effect on student achievement. Online services allow students to access data from anywhere they have a connection, thereby creating real time access. These factors affect library usage and library access, which affect student achievement.

Coordination involves sharing and communicating. Coordinated efforts are more effective efforts. When a district's library/media efforts are coordinated, they tend to meet the needs of supporting the curriculum, assisting teachers, and ultimately affecting student achievement. This affects library access, which affects student achievement.

## Location of Full-text Research Studies

The complete statistical studies and PowerPoint presentations may be found on the Missouri Department of Elementary and Secondary Education's Web site: [dese.mo.gov/divimprove/curriculum/lmcindex.htm](http://dese.mo.gov/divimprove/curriculum/lmcindex.htm).



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