

A Correlational Study of
MAP and WASL Mathematics Scores
of 4th Grade Students at Washington Elementary
School, Sunnyside, Washington

A Special Project

Presented to

Dr. Jack McPherson

Heritage University

In Partial Fulfillment

Of the Requirement for the Degree of

Masters of Education

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Summer 2007

FACULTY APPROVAL
A Correlational Study
of MAP and WASL Mathematics Scores
of 4th Grade Students at Washington Elementary
School, Sunnyside, Washington

Approved for the Faculty

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ABSTRACT

The purpose of this research study was to determine whether a correlation, if any, existed between 4th grade student MAP mathematics and WASL math scores recorded during 2006. Using a correlational design, math data were collected during the 2005-2006 school year on a population of one hundred elementary students. Only students that were administered the MAP and WASL in the spring of 2006 were included in the population. The data were statistically analyzed using the Pearson r correlation coefficient. The results of the study indicated that a significant relationship existed between MAP and WASL scores. The study recommended that educators should use this knowledge to identify students with math deficiencies and to provide them with selected instructional interventions before the WASL is administered.

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CHAPTER 1

Introduction

Background for the Project

For the first time ever, American educators have been held accountable for ensuring every child regardless of race, income, or special need, can read and perform mathematics at grade level. The nations latest report card in reading and mathematics indicated we are on the right track, but must pick up the pace to close the achievement gap and bring every child up to grade level or above by 2014 (ED.gov, 2005).

A key element in the federal No Child Left Behind Act was to determine if a child was making Adequate Yearly Progress (AYP) throughout their school years to help close the achievement gap. In the state of Washington, the Washington Assessment of Student Learning (WASL) test was adopted to measure this progress. The test was based on the Essential Academic Learning Requirements (EALR's) required by the state for all students in every discipline. The test was standardized and was used to assess what students know in reading, writing, mathematics and science. Beginning in 2005 students were required to pass the test in all subjects except science to receive a high school diploma (ED.gov).

In the Sunnyside, Washington, School District at Washington Elementary School (WES) fourth graders were passing the math segment of the WASL at a 35.9 percent rate. State-wide, fourth graders were passing this test at a rate of 49 percent. While the entire state needed improvement, it was obvious that students at WES needed to make even greater progress in their mathematics scores. If this was not accomplished, students would suffer by not meeting learning goals. Further, if AYP was not demonstrated, the state could place the school on a School Improvement Plan (SIP). If this occurred, some administrators and teachers risked being replaced. Current staff and administration needed to recognize the importance of helping students who risked failing the test (OSPI, 2005).

Students at WES were also administered the Measures of Academic Progress (MAP) test three times a year. The MAP was administered during second, third, fourth, and fifth grades. This computerized test was designed by the Northwest Evaluation Association (NEA) to measure academic growth over time and to provide teachers with quick access to information that could be used for instructional planning and school improvement. Could the MAP test be used as a tool to identify students who were at risk at failing the WASL? If yes, data obtained from this test could ultimately provide an intervention strategy, therefore allowing WES to have a system in place to improve WASL scores. In this study, the researcher (Ruben Fernandez, Jr.) attempted to find a direct

correlation between a student's MAP score and his/her WASL score.

Statement of the Problem

Without a measurement instrument to predict test results, it was difficult to intervene with corrective instructional interventions to help students succeed on the WASL. Consequently, MAP math test results needed to be analyzed to determine whether they could predict how students would perform on the WASL.

Phrased as a question, the problem which represented the focus of the present study may be stated as follows: Does a positive correlation, if any, exist between 4th grade student MAP and WASL math scores recorded during 2006?

Purpose of the Project

The purpose of this research study was to determine whether a correlation, if any, existed between 4th grade student MAP mathematics and WASL math scores recorded during 2006. To accomplish this purpose, a review of selected literature was conducted, baseline data were obtained and analyzed, and related conclusions and recommendations were formulated.

Delimitations

The study was confined to the 2005-2006 school year at WES. Data obtained for purposes of analysis included MAP and WASL math scores recorded for 2006. The participants were students enrolled in the 4th grade at WES. The preponderance of research cited in the review of selected literature was

current within the last five years.

Assumptions

For purposes of this study, the following assumptions were believed to be true:

1. Students completed the MAP and WASL tests to the best of their ability.
2. The results of the two tests represented accurate measures of mathematical ability.
3. Selected instructional interventions were successful in helping students pass the WASL.

Hypothesis or Research Question

A positive correlation will be found to exist between 4th grade student MAP and WASL mathematics scores.

Null Hypothesis

No significant correlation will be found between 4th grade student MAP and WASL mathematics scores. Significance was determined for $p \geq$ at 0.05, 0.01, 0.001, levels.

Significance of the Project

This study was designed to determine whether MAP testing was useful in determining how well students performed on the WASL, and to identify any correlation between student MAP and WASL test scores. If a correlation existed, the MAP test could be used to predict WASL performance. This information would provide WES an instrument needed to identify students with math deficiencies and to provide them with selected instructional interventions before the WASL was administered.

Procedure

Procedures employed in the present study evolved in several stages, as follows:

1. Permission for the study was obtained from and granted by Washington Elementary School Principal, Gwyn Trull.
2. Data for the WASL test were obtained from the Assessment Coordinator at Sunnyside School District, Lori Froese.
3. Data from the MAP test were obtained from the Northwest Evaluation Association website by the researcher.
4. A review of literature was conducted through the Heritage University Library and the Internet. Educational Resources Information Center (ERIC) and ProQuest databases were also used.
5. Instructions on how to interpret scores were obtained from OSPI and NEA websites by the researcher.

Definition of Terms

Significant terms used in the context of the present study have been defined as follows:

Annual yearly progress. Annual yearly progress was defined as the progress that each school made on an annual basis. The measurement tool that was used for this was the test that each state created based on their standards.

Correlational Research. Research that involves collecting data to determine whether, and to what degree, a relationship exists between two or more quantifiable variables.

DesCartes. The computer program from the NWEA that allowed teachers to access MAP test results.

Essential Academic Learning Requirements: Adopted by the State of Washington to help schools improve curricular focus in every subject area.

Measures of Academic Progress: Designed by the Northwest Evaluation Association to assess student knowledge in a variety of content areas.

No Child Left Behind Act: Passed into law in 2001 and contained high standards for all students including students that qualified for special education.

Pearson r : A measure of correlation appropriate when both variables are

expressed as continuous (i.e., ratio or interval) data; it takes into account each and every score and produces a coefficient between -1.00 and $+ 1.00$.

Standardized Tests: Achievement tests with certain distinctive features, including a fixed set of test items designed to measure a clearly defined achievement domain, specific directions for administering and scoring, and norms based on representative groups of individuals like those for whom the test was designed.

Washington Assessment of Student Learning: Adopted by the State of Washington as the primary, high stakes test for measuring student achievement in reading, writing, math and science.

Washington Elementary School: A Kindergarten through fifth grade elementary school in Sunnyside, Washington, whose 4th graders were passing the math segment of the WASL at a 35.9 percent rate.

Acronyms

AYP. Annual Yearly Progress

EALR. Essential Academic Learning Requirements

MAP. Measures of Academic Progress

NCLB. No Child Left Behind

NEA. Northwest Evaluation Association

OSPI. Office of Superintendent of Public Instruction

WASL. Washington Assessment of Student Learning

WES. Washington Elementary School

CHAPTER 2

Review of Selected Literature

Introduction

The review selected of literature and research summarized in Chapter 2 was organized to address:

1. No Child Left Behind Act.
2. High Stakes Testing.
3. Essential Academic Learning Requirements. (EALR's)
4. Washington Assessment of Student Learning. (WASL)
5. Measures of Academic Progress. (MAP)
6. Summary.

Data current primarily within the last 5 years were identified through an online computerized literature search of the Educational Resources Information Center (ERIC), the internet, and Proquest. A hand-search of selected research materials was also conducted.

No Child Left Behind Act

The No Child Left Behind Act (NCLB) was passed into law in 2001 and contained high standards for all students including students that qualified for special education. The act was designed around four main principles: Stronger accountability for test results; more freedom for states and communities; proven educational methods; and more choices for parents. The accountability for results

section endorsed the creation of state assessments that measured what students know in reading and mathematics. The states were free to develop tests that met certain goals and objectives, but did not have to be exactly the same from state to state. These tests were to be administered to students every year. Report cards for every school in every state were to be made available to the public. These report cards reported students Annual Yearly Progress (AYP) in different areas, as well as to provide information concerning the quality of the school and teachers. The public was also made aware of student performance in accordance with race, gender and other criteria. Statistics were also maintained to indicate how states were closing the achievement gap between disadvantaged and other student groups.

The NCLB Act added emphasis to proven instructional methods. Research was used more often to analyze which best practices and professional development opportunities were most effective in the education of students. Federal funding was available to support these endeavors that supported student learning and achievement. Finally, the NCLB Act gave parents more choices. Parents who had children in low-performing schools would be offered new options. If schools did not meet state standards for at least two years in a row, parents could transfer their child to another, higher-performing school within their district. The district was required to provide transportation to the new school.

After a third year, schools were required offer supplemental services such as tutoring, after-school services, and summer school for students (Department of Elementary and Secondary Education, 2006).

There were other details in the NCLB legislation that provided for highly qualified teachers, making all schools safer for students, promoting English proficiency, and the endorsement of charter schools. The first and second NCLB principles were particularly significant. These included the creation of a high stakes testing component to measure student performance. The Act was also responsible for the array of consequences placed on districts if they failed to meet standards. As stated by President George W. Bush, in 2005, “If you keep raising that bar, it’s amazing what can happen. I call it challenging the soft bigotry of low expectations. And that’s an important part of the No Child Left Behind Act” (Whitehouse.gov, 2007).

High Stakes Testing

Roderick & Engle (2003) explained the concept of testing was not new. Teachers used tests to measure what students know and how effectively their teaching strategies were working. Teachers were taught to establish goals and objectives, to use specific tactics to teach these goals and objectives, and then test students to see if there was adequate progress or growth. If there was no progress, the lesson needed to be re-taught. If the student did not understand the lesson, then a poor grade was awarded. This was the process. The era of high stakes

testing and NCLB was a very recent development. Before this time, many states allowed students to pass through each grade without any measurable objective other than their grades, which were at the mercy of teachers. There had always been the threat of retaining students, but it was never fully imposed on a regular basis. Public schools have long been known to pass students who were sometimes lacking even basic skills. Previously, high stakes testing existed only at the post secondary level. If a student was not performing up to standards, he/she would not only receive poor grades, but would also be denied a diploma. High stakes testing was also found in the working world. An employer would not promote an employee if he/she could not pass certain tests. What was the problem with mandating a high stakes test like the WASL to earn a high school diploma? All teachers, especially those at fourth, seventh, and tenth grade levels were now expected to cope with high stakes tests like the WASL. These teachers also felt pressured to teach to the test or to teach strategies and methods specifically designed to be successful on the test. Further, other subjects not deemed essential were in danger of being pushed aside. Finally, if too much time was spent helping students prepare for the WASL, other lesson planning suffered.

A high stakes, one-size fits-all test was also deemed unfair by opponents. Students with economic, language, or other disabilities were at a higher risk of failure on these types of tests. The achievement gap was well documented and

many times was not addressed before these tests were implemented. Some authorities cautioned that students should not have their future decided by one, single high stakes test decided on by the state (Loschert, K., Gleason, B., Carter, G., 2000). Elements of Student motivation including attention, relevance, confidence, and satisfaction were also factors now considered with these types of tests. Although many students were already used to working hard in school and generally performed better on tests, the assumption was made that lower achieving students might be able to perform at a higher level if high-stakes tests were adopted. Overall, however, students performed better when they received support from their teachers and felt responsible for their own learning (Rodrick, & Engle).

Essential Academic Learning Requirements (EALR's)

The state of Washington has adopted EALR's to help schools improve curricular focus. EALR's have been written for every subject and to address a variety of learning styles. Four basic goals of education have been incorporated into the Washington State Basic Education Act (BEA). These included:

1. Read with comprehension, write with skill, and communicate effectively in an array of ways and settings (BEA).
2. Know and apply ideas and principles of mathematics, science, civics and history, geography, art, and health and fitness (BEA).
3. Think analytically, logically, and creatively. Use experience and

knowledge to form judgments and problem solve (BEA).

4. Understand the importance of work, effort and decision making and how it applies to future career and educational opportunities. (RCW28A.150.210) (BEA).

The Washington State BEA required school curricula to be aligned with these goals. Accordingly, the WASL test has been designed to assess BEA goals in the subject areas of reading, writing, math, and science (OSPI).

Washington Assessment of Student Learning (WASL)

The WASL has been adopted by the State of Washington as the primary, high stakes test for measuring student achievement in reading, writing, math, and science. The WASL included short answer, multiple choice, problem solving, and essay questions. The test has been administered during April over a two-week period, in the fourth, seventh, and tenth grade. Last year's tenth graders (2006) were the first class required to pass the first three sections of the WASL to receive a diploma.

The WASL standardized test has typically been administered and proctored by teachers in each school district. Teachers who administered the WASL received special training. The test has not been timed and students may take as long as needed as long as the extension of time was reasonable. Special Education students such as those on a 504 plan, English as a Second

Language, and migrant students may request certain test accommodations.

The WASL test was developed by professional business leaders, teachers, and curriculum directors. A committee composed from Washington's diverse population was formed to review the fairness of wording in all questions to make sure none were racially insensitive, offensive, or difficult for disadvantaged students to understand. There were also numerous questions developed to modify the test from year to year (OSPI, 2007).

Administrators and teachers have been provided access to sample tests or questions to help guide student preparation for the WASL exam. Each year the previous test has been released to the public with complete answers. Criteria were established for grading all response questions. Good and bad examples of answers were provided along with statistics showing how many students got correct and incorrect answers for each question using a 0, 1, and 2 grading system. In the fall, results from each school district have been released to the public and posted on the OSPI website. For the most part, if a school showed improvement in scores everyone was satisfied. However, if a school showed little or no improvement there were questions to be answered, and possible sanctions imposed. For example, a school could be placed on a plan of improvement designed to require Annual Yearly Progress. This meant that the state might intervene to implement such a plan. In extreme cases some school administration and teachers may be replaced by the state (OSPI).

Measures of Academic Progress Test (MAP)

The MAP test designed by the Northwest Evaluation Association (NEA) was intended to assess student knowledge in a variety of content areas. The test offered a fast turnaround of results, was cost effective, saved time and afforded higher security. The MAP test also ensured that true academic growth was measured and suggested corrective instructional interventions to address student deficiencies. Over two thousand school districts have used the MAP test. Nationwide the test also professed to measure overall growth in learning and growth in specific goal areas for each subject. In addition, to provide detailed district-level reports, teachers also received reports for their individual classes enabling them to make data-driven decisions at all levels, and to adapt or modify a distinctive instructional program for each student (NEA.org, 2007).

The MAP test was available to assess student skill levels in reading, language usage, math, and science. When a student took this test on a computer, he/she started with a random question. If the student had difficulty with the first question, an easier question appeared until the student was able to be successful with the answer. If the student was able to answer the first question, the computer kept asking questions in this range of difficulty or in a higher range. After a student completed a test, results were made available to the student within 24 hours (NEA.org).

Results to the district were available within 72 hours. The tests were aligned with

state EALR's and were often used as an indicator of readiness for state assessments. Test results were saved so that each student could be tracked throughout his/her school career (NEA). The best thing about MAP tests was that they offered a corrective course for students who were in need of remediation. Teachers could log onto a website and reference results on the NEA DesCartes program. This program indicated where a student needed growth. Areas lacking in proficiency could be identified and the teacher, district, the student could be informed. In this way, specific instructional methods or areas would be recognized and instruction could be focused on problem areas (NEA.org).

Summary

The review of research and selected literature presented in Chapter 2 supported the following themes:

1. The NCLB, passed into law in 2001, contained high standards for all students including students that qualified for Special Education.
2. The advent of high stakes testing mandated that students demonstrate academic skill at or above grade level in basic academic subjects such as reading, writing, math, and science.
3. Washington State EALR's incorporated into the Basic Education Act required all students to:

- a. Read with comprehension, write with skill, and communicate effectively in variety of ways and settings.
- b. Know and apply ideas and principles of mathematics, science, civics, and history, geography, art, and health and fitness.
- c. Think analytically, logically, and creatively. Use experience and knowledge to form judgments and problem solve.
- d. Understand the importance of work, effort, and decision making and how these apply to future career and educational opportunities.

4. The WASL test has been adopted as the high stakes test in Washington State to assess student performance in reading, writing, math, and science.

5. The MAP test has been adopted by school districts nationwide to measure overall student growth in learning, and skill in specific goal areas for each subject.

CHAPTER 3

Methodology and Treatment of Data

Introduction

The purpose of this study was to determine whether a correlation, if any, existed between 4th grade student MAP mathematics and WASL math scores recorded during 2006. To accomplish this purpose, a review of selected literature was conducted, baseline data were obtained and analyzed, and related conclusions and recommendations were formulated.

Chapter 3 contains a description of the methodology used in the study. Additionally, the researcher (Ruben Fernandez, Jr.) included details concerning participants, instruments, design, procedure, treatment of the data, and summary.

Methodology

The researcher utilized a correlational research methodology to collect data to determine whether, and to what degree, a relationship exists between two or more quantifiable variables.

Participants

The sample for this study was selected from the total population of 100 4th-grade students at Washington Elementary School in Sunnyside, Washington. The population was 90% Hispanic, mainly of Mexican-American decent. Approximately 80% of students involved in the study qualified for the federal free and reduced lunch program.

Instruments

Assessment instruments used for this project included the MAP test in mathematics, administered in the spring of 2006, and the WASL test in math also administered to the same students in the spring of 2006. Data analysis utilized STATPAK computer software included in, Educational Research, Competencies for Analysis and Applications, (Gay & Airasian).

Design

Two test scores were obtained for each participating student. The first score was the MAP test math score; the second score was the WASL test score in mathematics. The tests were administered during a two week period in the spring of 2006. The paired scores for each student were correlated using the Pearson r test. Test results would indicate the degree of relationship between the two test scores.

Procedure

The researcher obtained permission from the WES building principal to undertake the study in March, 2006. Fourth grade student WASL and MAP mathematics scores were then provided by the Sunnyside School District Assessment Coordinator. After test scores were obtained, computer software was used to determine a possible correlation between the two sets of scores. Throughout 2006-2007, a review of literature was conducted through the Heritage University Library and the Internet. Educational Resources Information Center

(ERIC) and Proquest databases were also used. During summer 2007 data analysis was computed and related conclusions and recommendations were formulated.

Treatment of the Data

The Pearson r formula was used jointly with the STATPAK statistical software that accompanied Educational Research Competencies for Analysis and Applications by (Gay, Mills, & Airasian 2003), which allowed the researcher to compare MAP and WASL math scores for participating 4th grade students. Significance was determined for $p \geq$ at .05, .01, and .001 levels. The following formula was used to calculate for the Pearson r :

Summary

Chapter 3 provided a description of the research methodology employed in the study, participants, instruments used, research design, and procedure utilized. Details concerning treatment of the data obtained and analyzed were also presented.

CHAPTER 4

Analysis of Data

Introduction

The present study sought to determine whether a correlation existed between 4th grade student MAP and WASL mathematics scores at Washington Elementary School (WES) in Sunnyside, Washington. Accordingly, Chapter 4 has been organized to address: Description of the environment, hypothesis, null hypothesis, results of the study, and a summary.

Description of the Environment

The Sunnyside School District, located in Sunnyside, Washington, in the south central part of the state, served a total of about 6000 diverse students. Of 936 students attending WES, approximately 104 were enrolled in 4th grade. About 87.7 percent of the students were of Hispanic origin and 12.3 percent were Caucasian. Thirty percent of the students were migrant and more than 88 percent qualified for the federal free and reduced lunch program. The study included all fourth graders enrolled at WES during the 2005-2006 school year.

Hypothesis or Research Question

A positive correlation will be found to exist between 4th grade student MAP and WASL mathematics scores.

Null Hypothesis

No significant correlation will be found between 4th grade student MAP and WASL mathematics scores. Significance was determined for $p \geq$ at 0.05, 0.01, 0.001, levels.

Results of the Study

As shown in Table 1, 100 fourth grade students at WES were administered MAP and WASL mathematics test during 2006. The mean MAP score was 205.59 and the mean WASL score was 388.2. The minimum math score required to pass the WASL math component was 400.

Table 1

Title: Fourth Grade Student Mean MAP and WASL Math Scores, WES, 2006.

Number of Students Tested	Mean Score MAP math Test Group X Math scores	Mean score* WASL math test Group Y math scores
100	205.59	388.2

* note: Minimum score required to pass WASL math= 400.

Table 2 has provided a summary of raw scores of student MAP and WASL math scores. As indicated in the table, the Pearson *r* Product Moment Correlation Analysis produced the following findings.

The null hypothesis was rejected at .05, .01, and .001 levels and the hypothesis was supported at .05, .01, and .001 levels. The findings of the study indicated there was definite correlation between 4th grade MAP and WASL math scores. Students who performed well on the MAP math test achieved greater math success on the WASL than students who scored below average.

Discussion

The researcher predicted there was a positive correlation between 4th grade student MAP mathematics and WASL math scores recorded during 2006. As predicted, the study indicated that there was a correlational relationship between 4th grade student MAP mathematics and WASL math scores.

Summary

An analysis of data presented in Chapter 4 supported the hypothesis at .01, .05, .001, levels. Findings of the study indicated there was a definite correlation between MAP and WASL mathematics test scores. Students who performed well on the MAP math test achieved greater success on the WASL than students who scored below average.

Table 2

Pearson's Product Moment Correlation

Statistic	Value
Number of Items	100
Sum of X	20559.00
Sum of Y	38832.00
Sum of squared X	4237647.00
Sum of squared Y	15176142.00
Mean of "X" scores	205.59
Mean of "Y" scores	388.2
Sum of XY	8008659.00
Pearson's <i>r</i>	0.77
Degrees of Freedom	98

<i>Df</i>	0.05	0.01	0.001
98	0.1946	0.254	0.3211

Formula for Pearson's $r = \frac{\{XY\} - (\{X\})(\{Y\})}{N}$

$$= \frac{[\{X^2 - (\{X\})^2\}][\{Y^2 - (\{Y\})^2\}]}{N \quad N}$$

$$r = .77$$

CHAPTER 5

Summary, Conclusions and Recommendations

Summary

The purpose of this research study was to determine whether a correlation, if any, existed between 4th grade student MAP mathematics and WASL math scores recorded during 2006. To accomplish this purpose, a review of selected literature was conducted, baseline data were obtained and analyzed, and related conclusions and recommendations were formulated.

Conclusions

Based on a review of selected literature and major findings produced from the present study, the following conclusions were reached:

1. The NCLB Act, passed into law in 2001, contained high standards for all students including students that qualified for Special Education.
2. The advent of high stakes testing mandated that students demonstrate academic skill at or above grade level in basic academic subjects such as reading, writing, math, and science.
3. Washington State EALR's incorporated into the Basic Education Act required all students to:
 - a. Read with comprehension, write with skill, and communicate effectively in variety of ways and settings.
 - b. Know and apply ideas and principles of mathematics, science,

civics, and history, geography, art, and health and fitness.

- c. Think analytically, logically, and creatively. Use experience and knowledge to form judgements and problem solve.
- d. Understand the importance of work, effort, and decision making and how these apply to future career and educational opportunities.

4. The WASL test has been adopted as the high stakes test in Washington State to assess student performance in reading, writing, math, and science.

5. The MAP test has been adopted by school districts nationwide to measure overall student growth in learning, and skill in specific goal areas for each subject.

6. Data analysis supported the hypothesis that a positive correlation existed between 4th grade student MAP and WASL math scores recorded during 2006.

Recommendations

As a result of the conclusions cited above, the following recommendations have been suggested:

- 1. To support the federal mandate requiring high standards for all students, educators should promote NCLB related testing in the schools.

2. To help students demonstrate academic skill in reading, writing, mathematics, science, high stakes testing should be promoted in the schools.
3. To fulfill the Washington State Basic Education Act, educators should require students to:
 - a. Read with comprehension, write with skill, and communicate Effectively in a variety of ways and settings.
 - b. Know and apply ideas and principles of mathematics, science, civics, and history, geography, art, and health and fitness.
 - c. Think analytically, logically, and creatively.
 - d. Understand the importance of work, effort, and decision making and how these apply to future career and educational opportunities.
4. To address the issue of student diversity, the WASL should be modified to assure the test is not ethnically biased.
5. To support teachers, school districts should take a more active approach in setting up interventions for students who score low on MAP math assessments.
6. Understanding that a positive correlation exists between 4th grade student MAP and WASL math scores, educators should use this knowledge to identify students with math deficiencies and to provide them with selected instructional interventions before the WASL is administered.

7. School personnel seeking information related to the correlation of MAP and WASL mathematics scores may wish to utilize information contained in this study or, they may desire to undertake further research more suited for their unique needs.

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