# The Role of Teacher TeacherInsight<sup>™</sup> Scores and Teacher Demographic Characteristics in the Identification of Effective Teachers: Using Student Performance as a Validation Tool

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#### Abstract

The purpose of this study was to determine if effective teachers could be identified based on the association of teachers' Gallup TeacherInsight<sup>™</sup> scores and teachers' demographics with Teacher Group Average (TGA) gain in math and reading as measured by the Northwest Evaluation Association Measures of Academic Progress (NWEA MAP) Assessment. The targeted population consisted of 76 newly hired teachers who took the Gallup TeacherInsight assessment during the 2011-2012 school years. The sample included math and reading scores, as measured from the NWEA MAP Assessment, of 9,154 students of the 76 teachers.

Correlation coefficient tests, linear regression analysis, independent-samples *t* tests, and a one-way analysis of variance (ANOVA) were conducted for three research questions. Findings from the study revealed that there was no statistically significant association between teachers' TeacherInsight scores and TGA gain in math and reading as measured on the NWEA Map Assessment for Grades K-8. Analysis of the demographic data indicated no statistically significant association between gender, degree earned, and years of experience with TGA gain in math and reading. However, there was a significant statistical association between teacher building level and TGA gain in math and reading.

Findings from the literature review were mixed on the importance of using a commercial interview selection instrument to hire better teachers. Results from this study indicated that the teacher TeacherInsight scores should not be used as a final determiner in selecting highly effective teachers. Demographics such as gender, degree earned, building level, and years of experience showed limited associations with TGA

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gain in math and reading as measured on the NWEA MAP and should not be used to predict TGA gain. The most significant finding of the data analysis was that elementary school teachers' students TGA gain was greater than middle school teachers' students TGA gain in both reading and math. Further research should be done on commercial screening instruments and methods to aid in the hiring of highly effective teachers that will ultimately impact student performance.

# Dedication

This work is dedicated to my administrative colleagues who work tirelessly to hire the best teachers possible for the students they serve. I have had the privilege to work with administrators in three different states and they all have had the common goal of finding the best professionals to put in the classroom. I have been fortunate to work with these administrators that cared so much about their students and who also played a role in my professional and personal career by mentoring me along the way. As I have come from a family of educators, I would be remiss if I did not dedicate this work to all of the educated, working women in my family who have set the standard and drive for so many of us to aspire to and to be the best we can be in life.

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#### **Chapter One**

# Introduction

Education institutions consistently strive to place high-quality teachers in the classroom to maximize the academic development of students. The identification of viable teaching candidates by the human resource department of a school district and the hiring of the most qualified teachers are critical steps in establishing high level teaching excellence and student learning. The selection process of qualified teachers may be secondary to many other factors involved in the educational process in terms of the teachers' influence on learning (Darling-Hammond, 2000). However, in terms of institutional control, Loeb, Kalogrides, and Béteille (2012) stated that recruiting, retaining, and developing teachers might be the most important. Multiple variables influence the educational development of a student; however, as Darling-Hammond (2000) demonstrated, the quality of the teacher has been shown to be the largest influence in "student achievement in both reading and mathematics" (p. 1). Ample research supports the importance of quality teachers in maximizing student achievement (Correnti & Miller, 2002; Koretz & Hamilton, 2003; McCaffrey et al., 2000; Wright, Horn, & Sanders, 1997). Importantly, the degree to which excellent teaching can result in improved gains by students is significant. In a seminal study, Hanushek (1992) concluded that quality teaching can result in an improvement of "one full year of standardized achievement" (p. 113). Similarly, the University of Tennessee Value-Added Research and Assessment Center found support for their evaluative system in the form of improved student achievement (Sanders & Horn, 1998). They concluded that contrary to widely held perspectives, race, socioeconomic level, and class size are in fact

poor indicators of student academic growth; instead, the effectiveness of the teacher is the most important indicator of student academic progress (Sanders & Horn, 1998). Similarly, Marzano (2003) stated, "decisions made by individual teachers are far greater than the impact of decisions made at the school level" (p. 71). As these researchers have demonstrated, quality instruction at each level from Kindergarten through Grade 12 is of critical importance in order to maximize the educational development for all learners; however, the most important element in assuring that quality educators are in every classroom, which is the selection process of the teachers, is often ignored.

The selection of excellent teachers for the classroom is not a simple process. Many factors complicate the process of providing learners with quality teachers (Loeb et al., 2012). For example, policies established by school districts and enforced by administrators may facilitate excellent educational development for learners through the recruitment and hiring of quality teachers. However, this idealism can be problematic because districts must first establish hiring practices that identify the types of teachers needed to establish a strong academic culture. School districts rely on specific guidelines and methods in the hiring process to successfully attract and procure top-quality candidates with the requisite qualities. Districts "know the knowledge, skills, experiences, and beliefs they are looking for in teachers, and they develop ways of uncovering those qualities through the screening and interview process" (Things to Remember During the Teacher Hiring Season, 2005, p. 2). However principled these qualities may be, they remain difficult to concretely establish and replicate because of the lack of empirical support for methodologies that can help districts and administrators to identify excellent teachers. One popular method is to recruit teachers from highly

reputable colleges and universities identified as offering strong teacher education programs. The premise for this methodology is that students who demonstrate achievement at the collegiate level will likely demonstrate skill in teaching within the classroom. The actual classroom environment may differ considerably from the abstraction of the classroom environment presented to students in teacher education programs. In many cases, the most well-meaning and academically prepared teacher may encounter difficulties in imparting their knowledge to students in the actual classroom environment (Loeb & Miller, 2006). Similarly, teachers who have spent time practicing teaching under the advisement of master teachers may be capitalizing on established classroom management practices enforced by their supervisor. For these student teachers, the experience of teaching a real classroom may not match the reality of teaching without the benefit of a master teacher (Loeb & Miller, 2006).

Another method used by school districts is to engage prospective teachers in a rigorous application process (Carr & Fulmer, 2004). This approach includes letters of recommendation and requiring of credential files, which recruiters evaluate to establish a criterion of excellence in teaching. Primary importance in this process is the use of state-mandated tests that lead to appropriate credentials that are included in the application information provided to the district (Loeb & Miller, 2006). A major benefit associated with this form of evaluation is the confirmation of qualification of the considered instructor. These traditional forms of evaluating the potential success of teaching candidates may have limitations, because they do not necessarily measure the intrinsic qualities that will result in excellent teaching. Instead, they simply reflect that a candidate has gained approval by professors, and has passed a standardized test (Kornfeld

et al., 2007). Identifying potentially successful candidates who will be able to provide learners with exceptional instruction is a daunting process, made even more difficult for school districts inundated with applications for a limited number of positions. School districts are seeking to implement new hiring methodologies that can identify excellent teachers who will subsequently facilitate exceptional learning opportunities for learners (Regan & Hayes, 2011). Some districts have turned to the use of commercial screening instruments prior to formal interviews, which allow for discrete measures of abilities that go beyond credentialing test results, recommendations, and successful collegiate achievements.

A particular commercial online screening instrument used by many districts as part of the application process is the Gallup TeacherInsight<sup>™</sup> interview. Although its use as a solitary qualifier for success as a teacher may not be supported (Koerner, 2008), it presents promise in providing school districts with yet another valuable tool in determining the potential for success by teachers in the classroom (Regan & Hayes, 2011). The instrument includes research-based questions to help districts identify teachers who would be compatible with the vision of the district. The instrument is used to identify teachers with the best potential for teaching success, which in turn will translate into higher student achievement (Regan & Hayes, 2011). The Gallup TeacherInsight evaluative instrument presents intriguing possibilities to districts seeking to hire teachers who will maximize the development of their learners. This instrument identifies "the innate occurring thought pattern individuals display that is most like teachers who succeed in the classroom" (Listoe, 2008, p .1), and its use of multiplechoice questions and Likert scale responses, as well as its 45-minute administration time, make it a decidedly practical tool. In order to understand the ability for the instrument to provide districts and administrators with information that will best guide them in selecting excellent teachers, an evaluation of the instrument's effectiveness in a school district is required.

# Background

A Kansas school district (referred to in this study as the "district") was the setting for this study. According to data compiled by the Kansas State Department of Education (2012-2013), the district was comprised of a predominantly Caucasian population of students (78.45%), with a minority population of *other* students representing the largest minority in the district (13.80%). African-American and Hispanic students had a similar percentage of students in the district, at 3.09% and 4.66%, respectively. The distribution of male and female students was relatively even at 51.34% and 48.66% respectively. The district had a small percentage of students categorized as economically disadvantaged (8.07%). The teachers in the district averaged 13 years of experience, and over 85% had an advanced degree (Kansas State Department of Education, 2013). This district resides in the state of Kansas in a metropolitan area and has 20 elementary schools, 9 middle schools, and 5 high schools. The elementary schools include kindergarten through fifth grade and middle schools are sixth through eighth grades. In the 2012-2013 academic year, more than 20,000 students were enrolled in the district. This study focused on students assigned to newly hired staff who taught reading and math at the elementary and middle school levels (Kansas State Department of Education, 2013).

Since the late 1980s, the district had used the Gallup TeacherInsight assessment tool as a screening instrument for the influx of candidates applying for certified positions, according to the district's human resources specialist (B. Kreifels, personal communication, June 3, 2013). The district has an established protocol for teacher selection, which has faciliated evaluation of prospective teachers (see Figure 1).



Figure 1. Illustrates the teacher selection process in the Kansas district

The district had taken advantage of the efficient nature of the assessment to review the potential for teaching excellence among prospective employees in each of the last measured years (2011 and 2012), when applicants increased from 1,242 to 1,593 (see Table 1).

Table 1

School Level	2011	2012
Elementary	605 Applicants	812 Applicants
	Female: 508	Female: 693
	Male: 70	Male: 83
	No Response 27	No Response: 36
Middle School	637 Applicants	781 Applicants
	Female: 433	Female: 492
	Male: 149	Male: 244
	No Response: 55	No Response: 45
Total Applicants	1242	1593

District Applicants	Who	Completed	the	<b>TeacherInsi</b>	ght	in 2	<i>011</i>	and	2012

According to Smith (2014), the increase in candidates for open positions in school districts is not reflective of an increase in students; rather, it is a result of teachers currently under employment who are leaving their posts, most likely due to advanced age and retirement options. In order to select from a volume of applications for open positions, administrators and human resources personnel evaluate candidates in the applicant group to determine which individuals will translate their qualifications into

quality classroom instruction in such a way that will benefit students by maximizing their learning.

The district had also used an assessment to measure student growth in the areas of math and reading (E. Parks, personal communication, January 22, 2014). The assessment used was the Northwest Evaluation Association Measures of Academic Progress (NWEA MAP). Established over 40 years ago, this assessment is a diagnostic testing system that gives teachers the insight needed for student learning. As stated in the United States adoption of Common Core Standards, the potential for the alignment of standards to objective assessment has become more of a possibility. The MAP is an assessment that can provide such alignment, giving stakeholders critical information that can assist them in refining instruction (Brown & Coughlin, 2007). It provides educators with valuable information, which can assist in differentiating instruction, and can improve the quality of instruction provided to learners.

#### **Statement of the Problem**

School districts face challenges in meeting the needs of learners and maximizing their potential. There is a paucity of empirical research on whether the use of TeacherInsight results in the hiring of excellent teachers, with the determination of teacher excellence based on eventual academic growth of their students as measured by a standardized assessment (Koerner, 2007). Excellent teachers have demonstrated the ability to improve student performance as measured by objective assessment. Districts face problems in finding and applying effective objective hiring assessments that they can use to secure those teachers who are most likely to demonstrate consistently excellent teaching, therefore maximizing student performance. Districts also face the issue of evaluating the role teacher demographics play in affecting student achievement. According to Rice (2003), administrators would be well served by recognizing the complexity of the issue and adopting multiple measures to attract and hire new, highly effective teachers.

This study evaluated teacher demographics such as gender, degree earned, building level, and years of experience. The TeacherInsight instrument was examined, along with teacher demographics, as indicators of student achievement as measured on the NWEA MAP assessment. The Gallup TeacherInsight instrument has widespread use in school districts around the United States. This study evaluated the role of TeacherInsight scores and teacher demographics for identifying highly effective teachers.

# **Purpose of the Study**

The purpose of this quantitative study was to identify the role of teacher TeacherInsight scores and teacher demographics in the selection of highly effective teachers based on the eventual academic growth of their students as measured by a standardized assessment. This study determined the extent that an association exists between teacher scores on the Gallup TeacherInsight interview administered during 2011-2012 and growth in student achievement in Grades K-8 in the areas of math and reading as indicated on the NWEA MAP assessment. Further examined in this study was the relationship between the same group of teachers' gender, degree earned, building level, and years of experience in relation to student achievement in Grades K-8 as indicated on the NWEA MAP assessment.

# Significance of the Study

Assessing the relationship between teacher interview scores and their students' assessment scores is beneficial to school site-level administrators and human resources personnel as they evaluate their hiring process, ultimately making it possible to focus resources on identifying those teachers most likely to maximize student achievement. Determining that a relationship exists between teachers hired because of their TeacherInsight scores and their students' MAP scores would indicate that the tool might show promise in assisting districts in the identification of high-quality teachers. The findings from this study will be beneficial to human resources personnel as they look at the cost-benefit of using the TeacherInsight interview as the valuable first step in securing the highest quality teachers available, and ultimately will provide learners with greatest support for educational advancement.

# **Delimitations**

According to Lunenburg and Irby (2008), "Delimitations are self-imposed boundaries, set by the researcher regarding the purpose and scope of the study," (p. 134). The study was limited to TeacherInsight scores of K-8 teachers who were interviewed and hired by the district during 2011-2012. The study focused only on teachers hired for Grades K-8. Student data were limited to math and reading as measured by the MAP assessment in Grades K-8.

## Assumptions

Lunenburg and Irby (2008) stated, "Assumptions are postulates, premises, and propositions that are accepted as operational for purposes of the research. Assumptions include the nature, analysis, and interpretation of the data" (p. 135). The first assumption was that MAP assessment data were accurate for students in Grades K-8. The second assumption was that all student scores on the MAP assessment reflected their best effort. The third assumption was that all teacher candidate scores on the TeacherInsight interview reflected their best effort. A final assumption was that all teacher candidates took the online screening instrument in an ethical manner.

## **Research Questions**

Taken into consideration the wide variety of variables that could influence teacher effectiveness as well as student achievement, the focus of this exploratory study was to answer the following questions:

- **RQ1.** Is there an association between Gallup TeacherInsight scores and TGA for student gain in math and reading as measured with the MAP Assessment in Grades K-8?
- **RQ2.** Can a regression prediction model be identified for the variables Gallup TeacherInsight scores and TGA for student gain in math and reading as measured with the MAP Assessment in Grades K-8?
- **RQ3.** Is there a mean difference in TGA for student gain in math and reading, as measured with the MAP Assessment in Grades K-8, between and among certified teacher demographic variables (gender, degree earned, years of experience, building level) in Grades K-8?

# **Definition of Terms**

According to Lunenburg and Irby (2008), one should define all key terms that are central to the study and used throughout the dissertation. The following terms were referenced for this study.

Academic growth. This term is defined as the increase in a student's Rasch Unit score from the fall Measures of Academic Progress assessment to the spring Measures of Academic Progress assessment (Northwest Evaluation Association, 2013a).

**Gallup TeacherInsight Tool.** This is an automated online interview used by many school districts to help them identify the best potential teachers (Gallup, 2014).

MAP. This acronym refers to a formative testing system that responds to each individual child and gives teachers the insight needed for student learning (McWhorter, 2009).

**Rasch unit (RIT).** This term refers to a psychometric model for analyzing categorical data, such as answers to questions on a reading assessment or questionnaire responses, as a function of the trade-off between an individual's abilities, attitudes or personality traits and the item of difficulty (Bond & Fox, 2013).

**Separation.** This term refers to work separation, voluntary or involuntary, where teachers are asked not to come back or are forced to resign (the district).

**Teacher effectiveness.** This term refers to "The capacity a teacher has to influence student learning in a manner that results in learning gains as measured by specific goals or outcomes" (Kirchner, 2008, p.9).

TGA. This acronym refers to teacher group average—the sum of all student scores taught by an individual teacher/number of students (Ehrenberg, Gamoran, & Willms, 2001).

## **Overview of the Methodology**

This was a quantitative study to evaluate the role of teacher TeacherInsight scores and teacher demographics on eventual academic growth of elementary and middle school students in mathematics and reading as demonstrated in the Northwest Evaluation Association MAP. It evaluated the correlation between teacher scores as delineated by the Gallup TeacherInsight assessment. The sample was the group of newly hired teachers to the district in 2011 and 2012. The second sample group was Grades K-8 students taking the fall and spring MAP assessment. The instrumentation used for the newly hired teachers was the Gallup TeacherInsight assessment. The instrumentation used with the second sample group was the 2011-2012 fall and spring MAP assessment.

# **Organization of the Study**

Chapter one includes an introduction to the study. The purpose of the study was to determine if there was an association between teacher scores on the Gallup TeacherInsight assessment and growth in student achievement in Grades K-8 on the MAP. The study also examined the relationship of teacher demographics, including gender, degree earned, building level, and years of experience, to growth in student achievement in Grades K-8 on the MAP. This chapter includes the delimitations, assumptions, research questions, and definitions of the key terms. Chapter two presents a review of literature focused on (a) the qualities of effective teaching, (b) teacher characteristics gender, degree earned, building level, and years of experience, and (c) information on the Gallup TeacherInsight assessment tool. Chapter three outlines the research design. The population for the study and the description of the sample are included along with sampling procedures. Instrumentation, measurement, validity and reliability, data collection process, data analysis, hypothesis testing, and limitations related to the study are included in chapter three. Chapter four presents all data and the results of the study drawn. The chapter includes a detailed depiction of tables linked to the statistical data. Chapter five discusses the interpretation of the data, and shows a relationship to the literature review. Variables considered in the study and the relationship between the TeacherInsight, as well as teacher demographics, and student achievement on the MAP are reviewed in chapter five. The chapter also includes implications for action and suggestions for future study of the TeacherInsight assessment.

#### **Chapter Two**

# **Review of Literature**

# Rationale

The review of literature provides the framework for understanding the role of the teacher selection process as related to student performance outcomes. A challenge for school administrators is narrowing the application pool to select teachers who will produce gains in student performance. This review examines historical and changing practices in teacher hiring. This is a review of teacher quality and demographics that relate to student outcomes and achievement. Effective teacher interview strategies implemented during the teacher interview process is reviewed. Finally, the review provides information concerning commercial teacher perceiver systems, such as the Gallup TeacherInsight. The final part of this review focuses on the student assessment tool, Northwest Evaluation Association (MAP) Assessment.

#### **Historical Perspective of Teacher Hiring Practices**

Teaching hiring practices have evolved over time. Practices have changed to meet the pressure applied to schools to meet school goals that have resulted from national and state standards. According to Peterson (2002), "Teacher selection works best when it is approached in a rational, organized manner" (p. viii). A review of teacher hiring practices in New York state districts indicated most districts appeared to use a shared process for recruitment, similar to most school districts. Smaller districts may use school administration, superintendents, and building level administration for hiring teachers. In smaller districts that do not have human resources departments, head teachers may be included in the process. When the size of the district increases, human resource directors, school administrators, and department heads share in the recruitment process (Balter & Duncombe, 2005). The superintendent selects or approves members of hiring groups and makes final hiring decisions. Districts often utilize a teacher selection committee that consists of administrators and teachers, along with other staff or stakeholders. Unfortunately, not everyone who is in a position to hire teachers is good at it. Managing, supervising, and hiring are very different administrator skills. A solid record of hiring experience is the best indicator of a skilled administrator (Peterson, 2002).

School districts have looked at several advertising options, such as job postings with local colleges and job fairs. The progression of technology has allowed school districts to have access to a national market of teachers for a relatively low cost (Balter & Duncombe, 2005). A developed understanding of teacher selection has led to several changes to the hiring process. In addition, Peterson (2002) indicates the vision for teacher hiring should extend beyond the immediate vacancy, and instead should include a needs analysis, strategic planning, goal setting, projections, mission examination, and consideration of the context. Districts are looking for teachers who will improve and help their colleagues improve.

#### **Teacher Quality**

Teacher quality is the most important school-related factor affecting student achievement (Rice, 2003). In Tennessee, the school class size revealed achievement gains associated with small class sizes, where a stronger achievement gain was associated with teacher quality (Nye et al., 2004a). Another Tennessee study investigated the effects of highly qualified teachers on student achievement, where highly qualified teachers were defined as teachers whose average student score gain was in the top 25%. Results indicated that low-income students were more likely to benefit from highly qualified teacher instruction than were their more advantaged peers (Nye et al., 2004b).

Most research suggests that improving teacher quality is far better than other policy interventions, including that of lowering class size (Richardson, 2008). However, although knowing teacher quality is an important factor in improving student achievement, it is far less clear as to what constitutes a high quality teacher (Goldhaber, 2004). Some variables presumed to relate to teacher quality include years of education, years of teaching experience, measure of academic ability, measures of subject matter and teaching knowledge, certification status, and teacher behaviors in the classroom (Darling-Hammond, 2000).

Research consistently shows that teachers new to the profession make important gains in teaching quality in their first year teaching, and then smaller gains over the next few career years. However, no consistent linear relationship exists between years of teaching experience and student achievement after three initial years of teaching, which makes it more difficult to determine if there are any discernible differences among more veteran teachers—for instance, between teachers who have 7-10 years of experience and teachers with 20 or more years of experience (Murnane, 1975; Rivkin, Hanushek, & Kain, 2005; Rockoff, 2004).

Ehrenberg and Brewer (1994) investigated the effects of teachers' undergraduate institutions on student achievement and found that students scored higher on standardized exams when their teachers attended more selective undergraduate institutions. Likewise, the Greenwald, Hedges, and Laine (1996) meta-analysis concluded that school resources influence student achievement and that the relationships are large enough to be educationally important. In addition, resource variables that attempt to describe teacher quality, such as teacher ability, teacher education, and teacher experience, strongly influence student achievement (Greenwald et al., 1996).

Hawkins, Stancavage, and Dossey (1998) found that the more knowledge teachers reported having of the National Council on Teaching and Mathematics curriculum and evaluation standards, the higher their students performed on the National Assessment of Educational Progress (NAEP) mathematics assessment. Hanushek, Kain, and Rivkin (1999) investigated school-related factors on student achievement, analyzing 400,000 students in 3,000 schools, and concluded that although school quality was an important factor determinant to student achievement, the most important predictor for student success was teacher quality. The researchers estimated that, at minimum, variations in teacher quality accounted for 7.5% of the total variation in student achievement (Hanushek et al., 1999).

States must report efforts to meet federal highly qualified teacher mandates, including (a) determining the extent to which students have highly qualified teachers, (b) adopting implementation plans to ensure all teachers are highly qualified, and (c) publicly reporting the plans to meet the requirements and the progress toward meeting the requirements (Barnes, 2011, p. 64). Thus, based on highly qualified teacher mandates and requirements to meet the needs of all students, teacher quality classifications have taken on greater importance, especially since teachers have been identified as a significant factor mediating student achievement (Barnes, 2011; Rivkin et al., 2005).

Teacher quality has received attention both in the popular media and in the legitimate base of research literature (Barnes, 2011; Cook, 2003; Darling-Hammond,

2000; Jerald & Ingersoll, 2002; Lankford, Loeb, & Wyckoff, 2002; Lenker, 2006; Marzano, 2003; Wenglinsky, 2000). Within the context of highly-qualified teachers for all students, as well as increased achievement expectations for all students, publications such as the Educational Testing Service's (2002) *A National Priority: Americans Speak on Teacher Quality*, argue that teacher quality is more the ability to develop and design effective instruction as opposed to that of having pure content knowledge (Barnes, 2011).

While content mastery is important, more appropriate measures of teacher quality stem from mastery of effective lesson preparation, effective classroom management, and an effective understanding of student learning (Barnes, 2011; Darling-Hammond, Berry, & Thoreson, 2001; Haselkorn, 2001). In fact, the teacher quality debate does not question whether or not teachers matter, but rather which specific teacher qualities lead to the more effective teaching and thus increased student achievement (Barnes, 2011; Stronge, 2002; Walsh, 2001). The federal No Child Left Behind Act took the debate surrounding teacher quality and framed it as an issue solely of certification, degree status, and subject matter competency in each academic core subject being taught (Barnes, 2011).

High quality teachers significantly affect student achievement (Hanushek, Kain & Rivkin, 1999; Laczko-Kerr & Berliner, 2002; Sanders & Rivers, 1996; Wayne & Young, 2003). For example, Sanders and Rivers (1996) suggests that being taught by high quality teachers for three consecutive years may result in an approximate increase of 50% on standardized test scores. The debate surrounding teacher quality develops within the literature as particular aspects of teacher quality are assessed, such as (a) advanced degree

status, (b) National Board Certification, (c) years of experience, and (d) state licensure/certification (Barnes, 2011).

According to Maxson and Maxson (2002), the most important variable influencing student learning is teacher quality. Teacher quality may do more to increase student achievement than class size reduction programs can on their own. Common sense implies that it is better to have a great teacher in front of a large class rather than a mediocre one (Buckingham, 2003). In the bulletin of the U.S. National Association of Secondary School Principals (2002), Kaplan and Owings stated that research affirms that teacher quality is the most important factor influencing student achievement. Ferguson (1998), a Harvard University economist, stated, too, that teacher quality, not class size, is the most important factor in education. Australian research, as well, showed that the largest difference in achievement is between students in different classes, implying teacher instruction and teacher quality is the mediating factor (Buckingham, 2003).

After conducting an in-depth systematic literature search of previous literature reviews and individual studies related to teacher quality and student achievement, Zhang (2008) determined that previous investigations left unanswered questions as to the effects of teacher education level and experience on student achievement in science. As a result, Zhang investigated the extent to which teacher education and experience influenced middle school science achievement within a sample of 655 middle school students in 6th to 8th grades, and their 12 science teachers. Zhang found that science teachers who had advanced science degrees or education degrees had a significant impact on increased student achievement. Zhang, however, did not find a significant relationship between years of teaching experience in science and increased student achievement. Although teacher quality is an important variable in increasing student achievement, defining the strengths of a good teacher is a difficult task. However, there are several criteria of good teaching, including subject-matter mastery, curriculum content mastery, awareness of individual student abilities and capabilities, classroom management skills, appropriate knowledge and effective delivery of proven teaching strategies, and good verbal communication skills (Buckingham, 2003). As Stronge and Tucker (2003) asserted, "Without capable, highly-qualified teachers in America's classrooms, no educational reform process can possibly succeed" (p. 3).

# **Teacher Preparation/Academic Qualifications**

Studies have examined the effects of teacher education and teacher experience on student performance. Darling-Hammond (2000) stated that, "Quantitative analyses indicate that measures of teacher preparation and certification are by far the strongest correlates of student achievement in reading and mathematics, both before and after controlling for student poverty and language status" (p.1). Choy and Gifford (1980) concluded that teachers' total years of experience is important to the quality of education delivered to students. Murnane and Phillips (1981) concluded that teachers with three or fewer years of experience tend to be less effective than more experienced teachers. Darling-Hammond (1993), too, concluded that teachers with more teaching experience, as well as more education, tend to be more effective in the classroom. Such teachers are able to provide higher quality instruction, which results in higher levels of learning, which ultimately results in greater levels of student achievement (Darling-Hammond, 1993). Studies that are more recent indicate a connection between teacher preparation and qualifications and student achievement.

Gimbert, Cristol, and Sene (2007) stated that a significant relationship exists between teacher qualification and student achievement, as evidenced by research studies using different units of analysis, and using different measures of teacher qualification. In a regression analysis study, using data from the National Educational Longitudinal Study (NELS), Goldhaber and Brewer (2000) examined the effects of teacher certification on 12th grade students' math and science performance. Students who had teachers with mathematics degrees and/or teachers certified in mathematics outperformed students who had teachers without subject matter preparation. Students' mathematics test scores for students who had teachers with professional or full state certifications in mathematics were also higher than mathematics test scores for students who had teachers certified out of subject or who held private school certification. Math students who had teachers with bachelor and master's degrees in mathematics outperformed students who had teachers who were not credentialed in similar content areas. Science students taught by teachers who had no certification in science, or teachers who held private school certifications, showed lower scores than students who were taught by certified science teachers. The overall outcome of the study indicated that a significant relationship exists between teacher qualification and student achievement (Goldhaber & Brewer, 2000).

Darling-Hammond and Sykes (2003) furthered the importance of teacher preparation in that they considered the effects teacher training and experience had on student achievement. In a re-analysis of the Goldhaber and Brewer (2000) NELS study, Darling- Hammond and Sykes (2003) controlled for pre-test scores, content degrees, and years of experience, finding that students taught by teachers who were allowed to teach based on temporary or emergency permits, or who were new to teaching as a whole, attained smaller achievement gains than students who were taught by teachers with full state certification through a traditional pathway.

Literature on out-of-field teaching also supported the idea that effective teaching occurs when teachers have a minimum of subject-matter knowledge, or the equivalent of a content major (Gimbert et al., 2007; Goldhaber & Brewer, 2000; Monk, 1994). Hawk, Coble, and Swanson (1985) reported that subject-matter knowledge has a significant effect on student test scores in math and science, and that undergraduate majors or minors in mathematics or science enhance student achievement. Monk (1994) studied the national dataset for the Longitudinal Study of American Youth (LSAY) and found that teachers' education coursework also positively correlated to student academic achievement. Additionally, results indicated that subject matter education courses had a positive effect on student learning (Monk, 1994).

In a comparison study of teacher qualifications, student background, and school characteristics, Greenberg et al. (2004) examined the relationship between teacher qualifications and mathematics student achievement using nationwide data from the National Assessment of Educational Progress (NAEP). The researchers specifically defined teacher qualifications as teacher certification, academic major or minor, highest post-secondary degree, and years of teaching experience (Greenberg et al., 2004). Results indicated independent of other factors and teaching credentials, that teacher subject-matter certification and having a mathematics degree were the teacher qualifications most strongly associated with higher mathematics achievement among 8th grade public school students. Other results indicated that teachers most likely taught

students in high-ability math courses who held minors or majors in mathematics, as opposed to students in mid-ability or low-level math courses (Greenberg et al., 2004).

#### **Teacher Education Level and Experience**

Educational researchers have been focusing their attention for years on factors that influence student achievement (Zhang, 2008). Factors linked to increased student achievement include school-related factors, student-related factors, and teacher-related factors (Dossett & Minoz, 2003; Zhang, 2008). Within teacher-related factors, the United States Department of Education has deemed teacher quality as one of the most important factors contributing to student achievement. In fact, the U.S. Department of Education has stated that the most important factor contributing to poor student achievement may be unqualified teachers (Goldhaber, 2004). In support of the need for quality teachers in schools, an Education Week survey results indicated that improving teacher quality is the number one way to improve the quality of schools (Puriefoy & Edwards, 2002). The rationale behind quality teachers as a means of improving student performance stems from the belief that teacher quality can be modified through teacher certification expectations and through teacher training (Ye, 2000; Zhang, 2008).

Reviews relate to that of teacher experience in the subject being taught (Zhang, 2008). The reviews indicated did not look at the relationship between years of teaching experience in the particular subject being taught and student achievement (Zhang, 2008). It is likely that teachers having more years of experience teaching one particular subject will have a greater impact on student achievement in that subject than those teachers who have fewer years teaching that subject (Zhang, 2008). Thus, in addition to looking at

years of teacher experience, studies should look for years of experience teaching one particular subject.

Teacher experience and teacher education level are two common characteristics related to teacher quality, and are sometimes used as important criteria in hiring teachers since education and experience provide an indicator for skill level or expertise (Zhang, 2008). Teacher education level refers to the highest educational degree obtained and teacher experience refers to the number of years teachers have been teaching (Zhang, 2008). Research investigating the effects of teaching experience and the effects of teacher education level on student achievement level has been ongoing as far back as the 1960s (Hanushek, 1997). The No Child Left Behind Act of 2001 specifies that highly qualified teachers must hold at minimum a bachelor's degree (U.S. Department of Education, 2004). Since most teachers in the United States hold a bachelor's degree, more recent teacher education studies have focused on the degree of impact teachers with a master's degree or higher have on student achievement (Greenberg et al., 2004).

Zhang (2008) conducted a systematic literature search for previous literature reviews and individual studies related to teacher qualities and student achievement Zhang searched three electronic databases—ERIC via EBSCO host database, PsycINFO via EBSCO host database, and Digital Dissertations—to identify potential articles relevant to teacher qualities and student achievement. Zhang further broadened the search range by including several key words relevant to the search, including review, teacher quality, teacher factors, student outcome, and student achievement. Zhang found 155 results, and, after reading their abstracts, full-text, and reference lists, reduced the results to five systematic reviews.
Four studies were reviewed and the fifth provided conclusions. The four analyses yielded contradictory conclusions with regard to the relationship between teacher factors and student achievements (Zhang, 2008). Two reviews conducted by Hanushek (1989, 1997) yielded no strong evidence to support a positive link between teacher education and teacher experience and student achievement. Hanushek (1989) found in his first review that out of the 113 studies that investigated the relationship between teacher educater education level and student achievement, only eight of the studies, or 7%, revealed statistically significant positive results.

Of the 140 studies investigating the relationship between teacher experience and student achievement, Hanushek (1989) found that 40 studies, or a moderately small 29%, revealed statistically significant positive results. In his second review, Hanushek (1997) minimized bias by employing a value-added method such that different studies were assigned different weights according to their quality, and found less statistically significant results. Hanushek (1997) thus concluded that no positive relationship existed with respect to the effects of teacher education or teacher experience on student achievement. The other two meta-analysis reviews, conducted by Hedges, Laine, and Greenwald (1994) and Greenwald et al. (1996) indicated the opposite—that teacher education and teacher experience did indeed show strong relationships with regard to student achievement. Hedges et al. (1994) reanalyzed the studies reviewed by Hanushek in 1989, this time using the Fisher inverse chi-square method and combined effect size estimation methods. Hedges et al. tested null hypotheses in both positive and negative cases, and concluded that there was enough statistical evidence to support a positive relationship between teacher education and teacher experience on student achievement.

Richardson (2008) investigated the effects of teacher qualifications on middle school mathematics academic performance by predicting that mathematics teacher qualifications significantly impacted middle school student mathematics performance on the Alabama Reading and Math Test (ARMT). Richardson (2008) considered such factors as teacher preparation, certification, and teaching experience with their students' mathematics academic achievement. Richardson (2008) measured teacher qualifications by using four different variables, (a) the number of mathematics semester hours completed, (b) type of teacher certification, (c) total number of years teaching mathematics, and (d) total number of years teaching middle school mathematics.

Richardson's (2008) causal-comparative study included 20 full-time mathematics teachers from seven traditional middle/junior high schools in the Montgomery Public Schools District of Montgomery, Alabama. Richardson (2008) administered a *Teacher Background Survey*, analyzing the survey using a t-test, and then matched the results to student achievement data from the 2007 ARMT. Findings indicated a significant relationship existed between teacher qualifications and student achievement (Richardson, 2008). The results indicated that students with mathematics teachers with five or more years teaching experience performed better on the ARMT math portion (Richardson, 2008). Additionally, teachers with a traditional secondary mathematics certification had students who tended to score higher on the ARMT than did students with teachers with alternative certification (Richardson, 2008).

Research consistently shows that teachers tremendously influence student achievement (O'Donnell, 2010). In order to narrow the achievement gap, then, districts and schools must increase and retain quality teachers (O'Donnell, 2010). School districts typically measure quality teaching through variables such as degree attained, alternative certification, and teaching experience (O'Donnell, 2010). O'Donnell (2010) questioned whether the above-mentioned teacher factors actually reflect quality teachers who therefore influence student achievement gains. If degree attained, alternative certification, and teaching experience do not influence student achievement gains, it is necessary to determine what other teacher factors influence student achievement gains (O'Donnell, 2010). Determining what factors constitute teacher quality will ultimately affect teacher training, teacher hiring, and teacher firing (O'Donnell, 2010).

O'Donnell (2010) investigated the effect of teaching experience, highest degree level, and type of alternative certification on student achievement in California public schools. Using standardized test data from the California Department of Education, the researcher investigated the effect of teacher factors on student achievement, as measured by standardized test scores (O'Donnell, 2010). Results indicated that although teacher experience was positively related to student achievement, its impact was relatively small; higher degrees marginally increased or negatively decreased student achievement; and alternative certification programs negatively correlated to student achievement (O'Donnell, 2010).

Gao (2011) examined the effects of school resources on student mathematical achievement in Florida. School resources included teachers with advanced degrees, teacher experience, class size, school size, and per student expenditure (Gao, 2011). Gao also examined whether changes in school resources affected students from disadvantaged social groups, such as African Americans, Hispanics, and low socioeconomic status students. Gao's study occurred in the context of the No Child Left Behind (NCLB) Act and the accountability movement enacted in 2001, during which schools were held more accountable for student success, and where schools were held more accountable for hiring highly qualified teachers.

Gao (2011) analyzed the impact of school resources on student achievement in math. Results indicated that although class size and average years' teacher experience had little impact on student achievement in math, teachers with advanced degrees in math affected student achievement in math at the elementary and high school levels (Gao, 2011). Additionally, the percentage of courses taught by in-field teachers affected student achievement levels at the high school level (Gao, 2011).

# Subject Being Taught

Relevant literature suggested that associations between teacher quality and student achievement may exist in some academic subjects, such as math, but do not appear in other subjects, such as reading (Goldhaber & Brewer, 1996a). Wayne and Young (2003) pointed out in their review that associations between teacher influence on student learning varies across subjects, including math, reading, and science.

# **Degree Obtained**

Education research has attempted to isolate teachers' contributions to student performance by assessing the links between teacher degree level and student achievement and teacher experience and student achievement (Goldhaber, 2002). Teachers' education level is a widely-studied teacher attribute, mainly because it is easy to measure (Goldhaber, 2002). According to the U.S. Department of Education (2005), a bachelor's degree was the highest degree attained for 53% of teachers during the 1999-2000 school year. Forty-two percent of teachers had attained a master's degree, and 4% had attained a doctorate, professional, or education specialist degree (U.S. Department of Education, 2005, p. 4).

Goldhaber (2002) concluded, "Only 3% of the contribution teachers make to student learning is associated with teacher experience and degree obtained" (p. 53). Rice (2003) concluded that teachers with advanced degrees earned in their specific subject area have a more positive effect on high school mathematics and science achievement than if teachers attained a higher degree out-of-subject. Even though teachers' academic degree levels and years of teaching experience have been traditional indicators for teacher quality, research is inconsistent with respect to a solid connection between degree attained and student achievement (Greenwald et al., 1996; Hanushek et al., 2005). For example, Darling-Hammond (2000) conducted comprehensive quantitative analyses of data using a 50-state survey of policies, results from the Schools and Staffing Survey (SASS), and National Assessment of Educational Progress (NAEP). Darling-Hammond's review of the NAEP data from the 1992 and 1994 assessments demonstrated a modest correlation between advanced degree attainment and higher student achievement.

In contrast, Clotfelter, Ladd, and Vigdor (2006) asserted that having an advanced degree had no impact on student achievement. In fact, they claimed a negative correlation between advanced degree achievement for teachers and student achievement. In addition, they found that beginning teachers entering the classroom with a master's degree, or who earned a master's degree within the first five years of teaching, were equally as effective as teachers without a master's degree. Finally, teachers earning an

advanced degree after five or more years in practice were found to be less effective than teachers without a master's degree (Clotfelter et al., 2006).

Goldhaber and Brewer (1996b) suggested that studies investigating the effect of teacher advanced degrees on student achievement were inconclusive because the studies only examined level of degree, as opposed to examining whether the advanced degree corresponded with the subject being taught.

# **Teacher Experience**

Richardson (2008) investigated the effects of teacher quality and teacher years of experience on student achievement. In addition to their academic major, researchers have found that teacher experience is a factor that does contribute to increased student achievement (Richardson, 2008). In a comprehensive analysis examining the effects of teacher experience on student test scores, Greenwald et al. (1996) found a positive relationship between years of teacher experience and student achievement.

Hawkins et al. (1998) investigated the effects of teacher experience on student achievement in middle school math and found that students who had teachers with five or more years of experience teaching math were more likely to perform better on the NAEP standardized mathematics assessment than were students taught by teachers with fewer than five years teaching experience in math. Richardson (2008) also found that students taught by experienced teachers attain significantly higher achievement levels than do students who have new teachers with one to three years of teaching experience.

Hanushek et al. (2005) investigated the effects of teacher experience on student achievement, measuring teacher quality by the annual growth in student scores on the mathematics portion of the Texas Assessment of Academic Skills standardized test. The researchers examined student achievement for Grades 4 to 8 for the 1995-2001 school years and found that quality teachers increased student achievement (Hanushek et al., 2005). The researchers found that students taught by teachers in the 85th quality percentile could expect annual achievement gains of .22 standard deviations greater than students taught by median percentile teachers (Hanushek et al., 2005). Additionally, the study indicated that students who had first-year teachers had much smaller achievement gain than those students with teachers with more than one year teaching experience (Hanushek et al., 2005, p. 14).

Using data from the 2000 Math NAEP, Greenberg et al. (2004) investigated several teacher qualification characteristics, including certification, college or graduate school major, highest degree held, and experience, and their effects on student mathematics achievement. The researchers also divided teachers into two separate degree categories, those with a bachelor's degree, and those with a higher-level degree, such as a master's degree or doctorate (Greenberg et al., 2004). Finally, the researchers looked at years of teaching experience, including experience in mathematics and experience in other fields, and then defined experienced teachers as those with five or more years teaching experience (Greenberg et al., 2004). Greenburg found that teacher quality components of certification and subject matter competency were important. In addition, he found that teachers with advanced degrees had students who scored significantly higher on the NAEP mathematics assessment.

### Subject Matter Knowledge

Shulman (1986) believed that "teachers must not only be capable of defining for students what the accepted truths in a domain are. They must also be able to explain how

it relates to other propositions" (p. 9). Essentially, what teachers need to know about the subject matter they teach goes beyond specific topics within the curriculum; teaching students subject matter involves more than information delivery (Ball & McDiarmid, 1990). Teaching implies assisting students in developing intellectual wherewithal that enables students to participate in, and not merely know about, human thought and inquiry (Ball & McDiarmid, 1990). Teachers' subject matter knowledge shapes their practice and influences what they ask, how they ask, the ideas they reinforce, and the tasks they assign (Ball & McDiarmid, 1990).

According to the Center for Public Education, teacher content knowledge is a consistently strong predictor in relation to student performance, though studies differ regarding the strength of such effects (Richardson, 2008; Skandera & Sousa, 2003). According to Monk (1994), deep content knowledge is an important attribute regarding teacher effects on student achievement. Subject matter knowledge is an important component to quality teaching because it entails understanding of what needs to be taught and how to teach it (Ball & McDiarmid, 1990). Many tasks encompass teaching, including selecting worthwhile learning activities, giving helpful explanations, asking productive questions, and evaluating student learning; all these tasks, however, necessitate the teacher's understanding with respect to what students are to learn (Ball & McDiarmid, 1990). In the National Commission on Teaching and America's Future report published in 1996, data collected as part of the School and Staffing Survey drew attention to the fact that nearly 23% of all secondary teachers did not have a major or even a minor in their own teaching field (Richardson, 2008). Philosophical arguments

and common sense supports the idea that teachers' subject matter knowledge affects their efforts to help students learn subject matter (Ball & McDiarmid, 1990).

Consistent with common sense beliefs, studies indicated a positive connection between teachers' subject-matter preparation and student achievement (Wilson, Floden, & Ferrini-Mundy, 2001). Another study revealed that states that had a higher proportion of well-qualified teachers, as defined by full certification and major in their subject being taught, had higher achievement gains in mathematics and reading in Grades 4-8 (Wilson et al, 2001). This same study found a negative relationship between teachers with no major or minor in their subject being taught and student achievement (Wilson et al., 2001).

Allen (2003) found moderate support for the importance of subject matter knowledge and pointed out that the research was not detailed enough to clarify how much subject matter knowledge is critical with respect to specific course levels and grades. However, if teachers possess inaccurate information, lack of information, or approach knowledge in narrow ways, teachers may pass such ideas on to their students; teachers may fail to challenge misconceptions, may not use texts critically, or may significantly dispense inappropriate knowledge (Allen, 2003).

Subject matter knowledge is a central component to what teachers need to know, though education research has not necessarily focused on teachers' subject matter knowledge. Researchers tended to focus on other aspects related to teaching and learning to teach (Richardson, 2008). Ignoring the development of teachers' subject matter knowledge seems to marginalize its importance in teaching and learning (Ball & McDiarmid, 1990). Research consistently showed that an emphasis on teaching for meaning has positive effects on student learning, including better initial learning, better retention, and better knowledge transfer (Richardson, 2008).

As applied to mathematics, Leinhardt and Smith (1985) stated that, "as teachers increase their conceptual knowledge and become more fluid in connecting their knowledge to lesson presentation, their student mathematical competence should also improve" (p. 243). They investigated the effects of subject matter knowledge on teacher content delivery and student retention on 4th to 8th grade students and found that subject expertise significantly affected content delivery and student retention (Leinhardt & Smith, 1985).

Brewer (2003) believed that teachers must find a balance between their subject matter knowledge and methods used to effectively present information to students. Early subject matter knowledge studies by researchers found little evidence with respect to a link between subject matter knowledge and student achievement (Richardson, 2008). However, Goldhaber and Brewer (1996) found that subject-specific training for teachers in mathematics and science positively affected student achievement gains in those subject areas; their results suggest that greater subject matter knowledge is associated with student achievement gains. In a later study, Brewer (2003) additionally found that students with teachers with mathematics degrees had greater student achievement gains than did teachers without mathematics degrees, though Brewer found no such results for science achievement.

Other research studies found significant relationships between mathematics teacher knowledge and student achievement in mathematics (Richardson, 2008). Monk (1994) investigated the effects of secondary school mathematics teachers' knowledge on student achievement and found that teacher knowledge positively affected student achievement. Rowan et al. (2002) found that though the effect on student achievement was small, students taught by teachers with mathematics degrees yielded gains in student achievement. Similarly, Wenglinsky (2000) investigated 5,000 8th grade National Assessment of Educational Progress (NAEP) mathematics and science scores and found that mathematics and science teachers who majored or minored in their subject being taught elicited greater gains in student achievement than their counterparts who did not have a major or minor in their subject being taught.

Wenglinsky (2000) stated that students "whose teachers majored or minored in the subject they are teaching outperform their peers by 40% of a grade level in both math and science" (p. 7). Darling-Hammond (2000) identified the percentage of teachers who had a subject matter major was positively associated with a state's reading and mathematics score on the NAEP. Darling-Hammond (2000) also stated that in fields ranging from mathematics, science, reading, elementary education, vocational education, and early childhood education, researchers have found that teachers possessing greater knowledge regarding teaching and learning are more effective with students, which suggests that teacher subject matter knowledge positively influences student achievement.

### **Academic Majors or Minors/Certification**

A question related to teacher quality is how important a teacher's college major or minor affects student achievement (Richardson, 2008). Academic degree type often is a measure used to determine teacher qualifications (Skandera & Sousa, 2003).

Typically, research studying the effects of teacher quality on student achievement uses college degree major and/or minor to represent content knowledge (Richardson, 2008; Skandera & Sousa, 2003). Although there has been a dramatic increase in the number of teachers earning advanced degrees, teachers may not hold degrees in the subject that they teach (Richardson, 2008; Skandera & Sousa, 2003). However, the more technical the subject being taught, the less likely teachers have advanced preparation for that subject (Richardson, 2008; Skandera & Sousa, 2003).

Hawkins et al. (1998) discovered that 83% of 4th grade mathematics teachers had college majors in education rather than in mathematics or mathematics education; whereas over 50% of 8th grade mathematics teachers had majors in mathematics or mathematics education (p. 11). Similarly, Ingersoll (1999) studied academic majors and minors for 7th-12th grade public school teachers and found that 25% of all English teachers did not have a major or minor in English, or in areas commonly associated with English content knowledge, such as literature, communications, speech, journalism, English education, or reading education. Additionally, 33% of all life science teachers did not have a major or minor in physics, chemistry, geology, or earth science; and more than 50% of all history teachers did not have a major or minor in history (p. 28).

Disagreement surrounds teacher preparation expectations and qualifications related to high quality teachers (Richardson, 2008). Many researchers agreed that teachers possess a strong knowledge base with regard to the subjects they teach, although they questioned how that subject knowledge base translates into effective teaching (Richardson, 2008; Skandera & Sousa, 2003). Goldhaber and Brewer (1996) found that teachers with at least a major in their subject area ended being the most reliable predictor for math and science student achievement scores. Additionally, the researchers found that even though advanced degrees in general were not linked to higher achievement, an advanced degree specific to a subject area being taught was associated with higher student achievement (Goldhaber & Brewer, 1996).

Hawkins et al. (1998) found grade-level differences in terms of the relationship between teacher college major and mathematics student performance—4th grade students with teachers possessing a college major in mathematics education or education outperformed those students who had a teacher possessing a major in a field other than education, mathematics education, or mathematics. Eighth grade students, though, with teachers possessing a college major in mathematics outperformed those students who had a teacher possessing a college major in education, or a major in a field other than education, mathematics education, or mathematics.

Monk (1994) analyzed National Assessment of Educational Progress (NAEP) data and found a positive relationship between student performance and teachers' undergraduate mathematics coursework. Additionally, Darling-Hammond's (1998) research found that a teacher who did not have at least a minor in the subject being taught accounted for 20% of variation found in (NAEP) scores. Supporting numerous studies, Wenglinsky (2000) used a multi-level structural equation to analyze NAEP data and found that teachers possessing a major or minor in the subject area being taught produced greater gains in student achievement in both math and science. Lastly, Goldhaber and Brewer (2000) found that 12th grade students who had teachers possessing an undergraduate degree in mathematics outperformed their peers who had teachers who majored in other fields. However, as Tucker and Stronge (2005) stated, "While licensure or certification is a significant indicator of teacher quality, these factors alone are insufficient for teacher effectiveness" (p. 6).

# **Teacher Screening Process**

The role of the teacher in student performance is clearly important. This means that hiring and retaining excellent teachers is likely to have a lasting effect on student outcomes. The first step in this process is to decide on teacher screening and hiring practices. Peterson (2002) provides a guide to hiring the best teachers. He maintains that employers should evaluate different criteria during each phase of the interviewing process. Table 2 shows these criteria.

Table 2Evidence for Different Levels of Screening

Screening Level	Evidence
Level 1: All Applicants	Application forms, Resumes, Cover
	letters, Recommendations, Job
	experience, Written statements, and
	Professional-knowledge tests
Level 2: Top Four to Seven Applicants	Work samples or portfolios, Videotapes,
	Follow-up phone calls, Extended resume,
	Essays, District-made tests, and
	Interviews
Level 3: Top Three Applicants	Additional follow-up calls, Additional
	interviews, Performance sample,
	Personal visits to references, Group
	interview, and Additional essay

Note. Adapted from Peterson (2002).

School districts have the option of using Peterson's guide for getting the best candidates. The first stage is primarily a screening based on paper credentials submitted early in the application process. The second stage consists of an analysis of submitted materials, screener interviews, reference checks, and portfolios (Bolz, 2009). The second stage identifies candidates who will then proceed to the final stage of the process. The final step of Peterson's process includes in-depth interviews and necessary background checks leading to the final selection (Bolz, 2009). This process helps a school district to reach their goal of recruiting top candidates, having an efficient process, and hiring the most effective individuals.

## **Commercial Interview Selection Instruments**

An important responsibility that school administrators assume is selecting and hiring effective teachers. Teacher screening instruments have been developed to identify teacher applicants based upon specific research-based skills. Such screening instruments are designed to screen for candidates' strengths and dispositions that guide school administration in predicting teacher candidates who will be successful in meeting district goals and desired student achievement.

Examples of three teacher selection instruments that have been created to identify specific skills of a successful teacher include the following: Ventures for Excellence, Urban Teacher Selection (STAR Teacher) Interview, and the Gallup TeacherInsight. In 1974, Dr. Vic Cottrell developed the Ventures for Excellence Teacher Interview Questionnaire (Martin, 2008). Martin Haberman of the University of Wisconsin-Milwaukee National Research Council created the Urban Teacher Selection (STAR) Interview (Haberman 1995). The online Gallup TeacherInsight assessment evolved from the Teacher Perceiver Interview (TPI) (Stewart, 2014). According to Stewart (2014), the instruments are similar in that they have been designed commercially with a list of questions and scoring rubrics to determine the level at which applicants exhibit desirable qualities, attitudes, dispositions, and characteristics sought by school districts.

The Ventures for Excellence protocol is considered an effective hiring instrument that is valid, reliable, and accurately distinguishes among candidates to identify professionals who display the characteristics sought by districts in new hires. The Ventures for Excellence protocol is a structured 22 question interview format designed specifically to obtain responses that, when scored by trained interviewers, differentiate the most talented teacher candidates from the less talented ones (Robison, 2003). According to Cottrell (2004), the three themes of a quality teacher include purpose, relationships, and teaching and learning. This suggests several underlying beliefs about effective teachers. Effective teachers are committed to the democratic principle of a quality education for all students. Their relationships are based on caring, empathy, and motivating students to be involved in their own learning. Finally, ideally a teacher is perceptive, flexible, and understands quality assessment techniques.

Haberman (1995) has studied successful teachers of students who live in poverty and those in urban schools. He attributes turnover in those schools to ineffective teacher training and hiring practices. Mature teachers are more successful than novice teachers in an urban setting with a high level of poverty (Haberman, 1995). He also goes on to state, "school districts should hire decent people to teach who are nonjudgmental, nonmoralistic, not easily shocked, listen and hear, recognize bias, network, and do not have power needs" (Haberman, 1995, p. 93). Haberman's STAR interview process consists of a 30-minute structured interview that evaluates the dimensions outlined in Table 3.

Table 3

Dimension Assessed	Description
Persistence	Predicts the propensity to work with children who present learning and behavioral problems on a daily basis.
Organization and Planning	Refers to how and why STAR teachers plan, including their ability to manage complex classroom organizations
Values Student Learning	Predicts the degree to which the responses reflect a willingness to make student learning the teacher's highest priority.
Theory to Practice	Predicts the respondent's ability to see the practical implications of generalizations, as well as the concepts reflected by specific practices.
At-risk Students	Predicts the likelihood that the respondent will be able to connect with and teach students of all backgrounds and levels.
Approach to Students	Predicts the way the respondent will attempt to relate to students and the likelihood that this approach will be effective.
Survive in Bureaucracy	Predicts the likelihood that the respondent will be able to function as a teacher in a large, depersonalized organization.
Explains Teacher Success	Deals with the criteria the respondent uses to determine teaching success and whether they are relevant to teachers in poverty schools.
Explains Student Success	Deals with the criteria the respondent uses to determine student success and whether they are relevant to students in poverty schools.
Fallibility	Refers to how the teacher plans to deal with mistakes in the classroom

The Urban Teacher Selection (STAR) Interview Dimensions

*Note.* The source of the table information is Haberman Educational Foundation Prescreener (2006, para. 10).

Based on the STAR criteria, districts now know how to select teachers who can

succeed with children in poverty. The number of teachers in every urban school will

continue to grow, thus greatly affecting urban schools.

# Gallup TeacherInsight Instrument

The Gallup TeacherInsight assessment tool "is an automated online interview used by many school districts to help them identify the best potential teacher candidates" (Gallup, 2010, para. 1). The TeacherInsight tool is the electronic version of the Teacher Perceiver Instrument developed by the Gallup Organization (Koerner, 2007). This study focused on the Gallup TeacherInsight assessment. The TeacherInsight is fair because all applicants are asked the same questions and Gallup's instrument evaluates candidates exactly the same way (Gallup, 2010). Gallup's "questions have been thoroughly researched and tested to be sure they identify the best candidates possible" (Gallup, 2010, para. 1).

Gallup Extreme Teaching (2016) indicates that over three decades of Gallup research reveals quality teachers have extreme talent for teaching. They (a) "have a strong drive to see their students achieve their maximum potential," (b) "establish learning environments centered on close relationships," and (c) "promote an innovative yet ordered classroom structure" (Gallup Develop Extreme Teaching, 2016, para. 5). Gallup shares that very few teacher applicants from the extensive TeacherInsight teacher database exhibit extreme talent for teaching. However, by increasing the number of extremely talented teachers, districts increase the likelihood that students will be engaged in learning and set up for success (Gallup Develop Extreme Teaching, 2016).

According to Stewart (2014), the Gallup TeacherInsight Assessment has questions designed around behavioral themes. Table 4 provides details for these themes. Additionally, Kirchner (2008) explained the 12 themes were then grouped into three life themes: intrapersonal, interpersonal, and extrapersonal. Table 4

Gallup TeacherInsight Assessment Tool Behavioral Themes

Behavioral Themes	Description
Mission	The belief that students achieve success through the contributions of their teachers and other significant people in their lives.
Empathy	The belief the students' feelings and attitudes are essential to understand as a teacher to recognize students' point of view.
Rapport Drive	The belief that a positive relationship with a student is essential to maximizing that student's potential.
Listening	The belief that, in maximizing communication, the teacher must be a responsive listener.
Investment	The belief that intrinsic value as a teacher is derived from student growth and the teacher's effort to achieve this growth.
Input Drive	The belief the teacher must be resourceful in searching for ideas and strategies to maximize student learning
Activation	The belief the teacher is the catalyst for student learning and his or her actions serve as an instigator in stimulating student learning.
Innovation	The belief the teacher must be creative and adaptive in finding effective ways to promote student learning positively.
Gestalt	The belief of task completion and drive to succeed in achieving student learning.
Fallibility	Refers to how the teacher plans to deal with mistakes in the classroom.
Objectivity	The belief that the teacher must look at the whole before he or she can dissect and address the pieces of student learning.
Focus	The belief that the teacher has a plan for his or her future actions that center on the goal of student learning.

Note. The source of the table information is Stewart (2014, p.47-48).

Gallup (2004) investigated the predictive validity of the TeacherInsight across multiple school districts using administrator and student ratings. In the study, 491 teachers participated. The study evaluated characteristics such as age, gender, and race. The study showed the higher principals and students rated the teachers, the higher the teacher's TeacherInsight percent score. In addition, the higher the TeacherInsight percent score, the higher the students rated their satisfaction with the teacher. The study concluded by stating that teachers that score at or above 63% on the TeacherInsight are 1.6 times more likely to be rated among the top quartile of teachers, and those who scored below 63% are 3.4 times more likely to be rated among the bottom quartile of teachers than the top. There were no findings related to age, gender, and race (Koerner, 2007). The TeacherInsight index from 2011 is outlined in Table 5.

Table 5

TeacherInsight Index 2011

Percentage of Possible Points	Percentile Rank of Applicant Pool
100-84	99-91
83-80	90-81
79-78	80-71
77-76	76-61
75-73	60-51
72	50-41
71-69	40-31
68-67	30-21
66-64	20-11
63-0	10-1

Note. Approximately 80% of applicants score 64-83. (Gallup, 2010).

Karl Brown (2004) examined if the use of TeacherInsight resulted in hiring more effective teachers and influenced teacher separation rates. The study considered if TeacherInsight components or themes were related to effective teaching. The results of the study indicated that administrators perceived teachers hired based on their TeacherInsight scores as better overall teachers; teachers who performed higher on the overall theme categories, as well as on specific theme questions, were more likely to be rated as more effective teachers; and teachers hired with the instrument had higher retention rates (Brown, 2004).

Research varies regarding the effectiveness of the Gallup TeacherInsight instrument. According to McRobbie (2000), the best way to get qualified teachers is "promote a continuum of teacher development that starts with recruitment and continues throughout a teacher's career" (p. 4-5). This process involves the recruitment, preparation, induction, ongoing professional development, and support of teacher learning (McRobbie, 2000). Furthermore, McRobbie explained that quality teachers possess strong content knowledge, the ability to teach, the ability to design curriculum and assessment, and are committed to learning strategies to meet the needs of students. They also have experiences with mentor teachers and professional development (McRobbie, 2000). In conclusion, Wilson stated, "The research fails to suggest that the natural ability identified by the TeacherInsight instrument is critical in the improving of students' performance in reading and mathematics." (2009, p. 2).

# Summary

Chapter two included a review of literature on the historical perspective of teacher hiring practices and how those practices have evolved. The chapter also explored teacher quality, teacher preparation and academic qualifications, teacher education level and experience, and academic majors and minors. The teacher screening process and the use of commercial interview selection instruments were also a focus of chapter two. Over time, those instruments were refined and districts had the opportunity to select an instrument which best served their purpose. The research within this chapter validates that teacher quality has a direct impact on student achievement. The literature also demonstrates the need for teacher qualification and the importance of the teacher's education level. The relationship between teacher majors and minors and student performance was examined in the chapter. Findings from the literature review were mixed on the importance of using a commercial interview selection instrument to hire better teachers.

In chapter three, the research methods are explained in detail. Chapter three includes the research design, the population sample, sampling procedures, and the instrumentation used in the study, with specifics about the measurement with validity and reliability information. The data collection procedures, data analysis, hypothesis testing, and limitations of the study are also explained in chapter three.

## **Chapter Three**

The purpose of this quantitative study was to determine the role of teacher TeacherInsight scores and teacher demographics in the selection of highly effective teachers based on the eventual academic growth of their students as measured by a standardized assessment. This study determined the extent that an association exists between teacher scores on the Gallup TeacherInsight interview administered during 2011-2012 and growth in student achievement in Grades K-8 in the areas of math and reading as indicated on the NWEA MAP assessment. Further examined in this study was the relationship between the same group of teachers' gender, degree earned, building level, and years of experience in relation to student achievement in Grades K-8 as indicated on the NWEA MAP assessment. This chapter includes a detailed description of research design, population and sample, sampling procedures, instrumentation, measurement, validity and reliability, data collection procedures, data analysis and hypothesis testing, as well as the limitations employed in the study.

#### **Research Design**

This quantitative study used a correlation coefficient test and a linear regression analysis in order to identify the extent to which an association exists between teacher scores on the Gallup TeacherInsight interview and TGA gain in math and reading in Grades K-8 on the NWEA MAP assessment. Independent-samples *t* tests were used to compare TGA gain in math and reading in Grades K-8 as measured on the NWEA MAP assessment, and teacher demographics of gender, degree earned, and building level. A one-factor analysis of variance (ANOVA) was conducted to test significant mean gain differences in TGA for student gain in math and reading, as measured with the NWEA MAP assessment in Grades K-8, between and among the teachers' years of experience.

The quantitative research design included the independent variable of the Gallup TeacherInsight scores and demographic variables of gender, degree earned, building level, and years of experience. Gallup TeacherInsight composite scores were obtained from the human resources office in the district analyzed in the present study. The dependent variable was the NWEA MAP Assessment scores in reading and math for students in Grades K-8. Student scores on the NWEA MAP were from the classrooms of teachers newly hired by the district in 2011-2012.

A Person product moment correlation coefficient analysis was used to test the association between the independent variable of teachers' TeacherInsight scores and the dependent variable of TGA gain in math and reading for students' as measured on the NWEA MAP Assessments. According to Lunenburg and Irby (2008), this analysis "lends meaning to your findings by giving you the size or degree of the relationship" (p. 36).

The simple linear regression was applied in order to predict relationships. According to Lunenburg and Irby (2008), this "provides not only the relationship between variables but also the magnitude of the relationships" (p. 80). The study compared the dependent variable of TGA gain in math and reading for students as measured on the NWEA MAP Assessment with the independent variable of teachers' TeacherInsight scores. This determined whether teacher scores on the TeacherInsight assessment predicted a greater growth on student scores as measured on the NWEA MAP Assessment. A *t* test for independence was applied to the independent demographic variables of gender, degree earned, and building level to test the mean association of these demographic variables to the dependent variable of TGA gain in math and reading as measured by the NWEA MAP Assessment. According to Luneburg and Irby (2008), "a mean from one group is compared with a mean from another group to determine the probability that the corresponding population means are different" (p. 70).

A one-way analysis of variance (ANOVA) was used to compare the independent demographic variable of years of experience with the dependent variable of TGA gain in math and reading as measured by the NWEA MAP Assessment. The years of experience variable consisted of three categories for the number of years of teachers' experience. According to Luneburg and Irby (2008), "ANOVA allows you to test the differences between all groups" (p.72).

# **Population and Sample**

The targeted population consisted of newly hired teachers who took the Gallup TeacherInsight assessment during 2011-2012 in the district. Students in the sample were from Grades K-8 who had taken the Northwest Evaluation Association's (NWEA) MAP exam during the 2011-2012 and 2012-2013 school years in the district. The sample included 76 certified elementary and middle school public school teachers who taught reading and math. The sample also included 9,154 students in Grades K-8 who were students of the 76 teachers in the study.

# **Sampling Procedures**

Purposive sampling was used to identify the participants of this study, comprised of newly hired teachers in the district during 2011-2012. This sampling methodology

was particularly useful for the present study as it involves selecting a sample based on the researcher's experience or knowledge of the group to be sampled (Lunenburg & Irby, 2008. p.175). Each teacher participant of the study held Kansas teaching certificates. Each teacher had also completed the TeacherInsight assessment online during the application process by the district. The archived MAP data was accessed from the district database of students of the teacher participants.

### Instrumentation

There were two distinct instruments: the Gallup TeacherInsight, an online assessment that measures teaching talent and strengths, and MAP, which assesses the academic achievement of the students. According to Smith (2005), Gallup TeacherInsight provides an evaluation that "is based on an applicant's responses and includes a score that predicts the potential for teaching success based on talents" (p. 19). The instrument is used as a screening tool by school districts for reducing the size of the pool of available teachers to streamline the teacher selection process and to identify candidates of higher quality. Candidates take the online assessment in a non-proctored setting once during a 12-month period. Scores are then submitted to the agents of the district's human resources department and are used for hiring purposes, which can include the prediction of success of the individual as a teacher. The TeacherInsight instrument includes over 50 multiple choice and Likert scale questions (see Appendix A) (Regan and Hayes, 2011, p. 4).

School districts using the interview instrument determine the appropriate range for their applicants to move forward in the hiring process. Although the district cannot release scores, Gallup recommends an auxiliary use of the instrument: "Gallup recommends that school districts use the TeacherInsight interview as one piece of information when making their selection decisions" (TeacherInsight Assessment Frequently Asked Questions, 2014). Allowing districts to determine the range provides flexibility in hiring, which may allow them to use a score lower than they might have preferred for certain positions.

The assessment instrument used to measure the dependent variable was MAP, created by the Northwest Evaluation Association (NEA, 2014a). NWEA, based in Portland, Oregon, introduced the nation's first computer adaptive educational assessment in 1985 with the goal of transforming education with precise data (NWEA History, 2014). This consortium promotes student learning through diverse assessment forms. One product is the MAP assessment. The underlying principle of the MAP is as follows:

Each child learns differently. Therefore, we developed computerized adaptive assessments that test differently, allowing teachers to see their students as individuals—each with their own base of knowledge. With flexible delivery options, the assessments can be scaled to fit students' needs. (Northwest Evaluation Association, 2012a)

The district assessed all students in Grades K-8 in the fall and spring using the MAP in 2011-2012 and 2012-2013 in reading and math. The mathematics and reading assessments are computerized, teacher-proctored tests designed to adapt to individual student levels (NWEA, 2012b). The MAP assessment in Grades 3 through 8 for mathematics and reading assessments are multiple-choice with the math portion containing 52 questions and the reading containing 42 questions. Kindergarten through second grade students in the district took the mathematics and reading assessment in two

sessions. The reading and math portions of the assessment each have 35 questions for each session, totaling 70 questions for each test (NWEA, 2012b). Students in Grades K-5 take both the reading and math assessment in two sessions, which allows for shorter test sessions, and greater focus. NWEA describes the K-2 test as being very user friendly to primary students. The test used pictures and symbols to assist the children as they advance through the testing process (B. Kennedy, personal communication, July 19, 2012). The NWEA (2012b) maintains that students have the option during the math assessment to use a calculator. Students may use paper and pencil, and ask to have words pronounced. On the reading test, students may only ask a question regarding the testing process; content questions may not be answered. Both of the tests take approximately 50 minutes to complete; however, the test is not timed.

NWEA (2014b) states, "goal structures are created through an alignment process that links state standards documents to the NWEA item bank" (para 4). The categories on the MAP (NWEA 2012c) assessment according to NWEA are as follows:

## Mathematics Goal Structure

- 1. Number and Computation
- 2. Algebra
- 3. Geometry
- 4. Data (pp. 6-10)

# Reading Goal Structure

- 1. Print Concepts, Vocabulary, and Word Analysis
- 2. Comprehending Text: Informational
- 3. Comprehending Texts: Literary (p. 11)

Students with special needs who have an Individualized Educational Plan (IEP) may use all their specialized services that may apply during the test-taking time. A quiet individualized setting or extra time may be an appropriate accommodation for students with identified learning disabilities on their IEP. At the end of the test, students can view their scores that appear on the screen. The score is reported in the form of a Rasch unit (RIT) score, which allows for analysis of the influence of the teacher on student growth. NWEA (2012b) states the following about RIT:

The RIT score relates directly to the curriculum scale in each subject area. It is an equal-interval score, like feet and inches, so scores can be added together to calculate accurate class or school averages. RIT scores range from about 100 to 300. RIT scores make it possible to follow a student's educational growth from year to year. (p. 2)

The targeted sample population consisted of newly hired teachers during the summers of 2011 and 2012 in the district. Student data in the sample were from students in Grades K-8 who had taken the Northwest Evaluation Association's (NWEA) MAP exam during the 2011-2012 and 2012-2013 school years in the district. The current study was based on archived data and the scores were assessed through the district's database. The study provides one year of data for each teacher in the target group.

Alignment. The Gallup TeacherInsight was the teacher interview tool selected by the district in which the study took place. The tool was selected by the district because it provided them with data that helped shorten the selection process and helped them obtain the most qualified candidates. The human resources department receives hundreds of applications each year, and could not possibly screen them without a professionally designed screening tool (B. Kreifels, personal communication, April 10, 2012). According to this representative of the district, the ultimate goal was not just to shorten the hiring process, but also to narrow the pool of applicants to those who have the greatest potential for helping students attain a high level of student achievement if hired. The TeacherInsight assessment tool served this purpose, with its ability to reflect longitudinal performance through scale, providing variability on percentile differences over time.

The MAP suits the needs of the present study by providing both a fall and spring assessment, allowing for discernment of a progression of development. The MAP also provides teachers with an early assessment during the school year, which they can then use to adjust their teaching to meet the needs of students and their classroom. Post testing was conducted, which allowed teachers potentially validate teaching methodologies, ultimately enabling teachers to reflect upon their own teaching methodologies.

**Validity and reliability.** Gallup developed the TeacherInsight after years of studying the techniques of successful teachers (Gallup, 2013). According to Wilson (2009), Gallup conducted a study in 2003-2004 to predict validity of TeacherInsight compared to teacher and student ratings in Grades K-12. The Gallup authors of that study found the reliability of the TeacherInsight interview to be .77. Using the Taylor-Russell tables (1939), the report suggests that the TeacherInsight instrument increases the proportion of successfully hired teachers by 15 to 18%. Gallup promotes that it can help districts find "the best potential teachers" (Gallup, 2013).

Additionally, this method of assessment also had reliability owing to the relevance of measurement of the level of conscientiousness and general mental ability of the employees. It is noted that this measure not only has effectiveness as a preemployment indicator, but also serves as a guide for creating post-employment outcomes and expectations for the employers in respect to the specific teachers (Fry, 2013). However, not enough research has been performed to evaluate with certainty the validity of the TeacherInsight tool as predictive of both teacher success and student achievement. The TeacherInsight instrument potentially could provide a valuable measure of the future teacher successes in the classroom.

NWEA purports to "deliver valid, reliable, and real-time growth and proficiency data" (NWEA, 2012a, p.2). The validity of the MAP has rigorous scale norms (NWEA, 2012a, p. xv). Extensive research is ongoing by NWEA to maintain the continuing validity of the MAP assessment. The reading and math tests are administered in the same setting approximately two to three weeks apart. According to NWEA (2004), the content validity of the test is guaranteed by careful mapping of existing content standards from a district or a state into a test blueprint. NWEA test items are selected for a specific test based on their match to the state standards as well as the difficulty level on which the test is being created. Every effort is made within a goal area to select items with an evenly distributed level of difficulty. Furthermore, according to NWEA (2004), documented validity evidence for NWEA tests comes in the form of concurrent validity expressed in the form of a Pearson correlation coefficient. The Pearson correlation coefficient answers the question regarding how well the scores from the test that reference RIT scale in the subject area correspond to the scores obtained from an established test that

references some other subject area. Perhaps its greatest strength is that it is "drawn from very large item pools that span grade levels" (Militello, Schweid, & Sireci 2010, p. 9).

The MAP serves to strengthen findings for the stakeholders. The test functions most adroitly in "evaluating growth [and] general content inferences" (Militello et al., 2010, p. 20), and assists districts, administrators, and teachers in "curricular growth monitoring and student growth monitoring" (Militello et al., 2010, p. 20). According to Militello et al. (2010), the MAP delivers validity with confidence, especially when the instrument is aligned with "the intended and communicated purposes of the district" (p. 21). As a result, information needed by the district is often available through the means of MAP, even though pre and post-instructional differences in instructions for the students are difficult to gather from this measure.

### **Data Collection Procedures**

The district revealed that scores on the TeacherInsight instrument would be released pending approval by the Director of Assessment and Research. On July 18, 2012, permission applications were requested from the district to conduct the study using MAP assessment data for Grades K-8. The district provided permission (see Appendix B), and a request was then submitted to the Baker University Institutional Review Board for approval of the research topic. The current study was approved by Baker University on September 1, 2016 (see Appendix C). Student data was accessed through the district's archived database. The human resource department of the district provided TeacherInsight screening assessment scores the teacher demographics for teachers hired in the summer of 2011 and the summer of 2012. Teachers and students names were used in the data collection process for comparing teachers' TeacherInsight scores with student data. However, for the study, teachers and students data were anonymous.

Student results on the Measures of Academic Progress (MAP) assessment in the areas of mathematics and reading were retrieved from the district's archived student database. The results obtained were from the fall and spring tests given during the 2011-2012 and 2012-2013 school years. Class lists were reviewed to determine overall class growth on the MAP assessment during the school year. The technology specialist retrieved archived MAP data for the current study from the district's database.

# **Data Analysis and Hypothesis Testing**

This quantitative study examined teachers' Gallup TeacherInsight assessment scores and their TGA gain in math and reading as measured by the NWEA MAP. In addition, teacher demographics of gender, degree earned, building level, and years of experience were examined to determine association between these variables and TGA gain in math and reading. The following research questions and hypotheses were used to guide the study.

**RQ1.** Is there an association between Gallup TeacherInsight scores and TGA for student gain in math and reading as measured with the MAP Assessment in Grades K-8?

*H1*. Certified K through Grade 8 teacher Gallup TeacherInsight scores are significantly correlated to TGA math and reading gains as measured with the MAP Assessment in Grades K-8.

A Pearson product moment coefficient was used to address RQ1. The correlation coefficient was evaluated to determine strength and direction of the relationship between teachers' TeacherInsight scores and TGA gain in math and reading.

**RQ2.** Can a regression prediction model be identified for the variables Gallup TeacherInsight scores and TGA for student gain in math and reading as measured with the MAP Assessment in Grades K-8?

*H2.* A significant prediction model was found. Certified K through Grade 8 teacher Gallup TeacherInsight scores were found to significantly predict TGA math and reading gains as measured with the MAP Assessment.

A test for the existence of a simple linear regression model was conducted to address RQ2. The model's regression equation was then used to evaluate if there was a statistically significant result that determined whether the teachers' TeacherInsight score predicts TGA gain in math and reading as measured by the NWEA MAP.

**RQ3.** Is there a mean difference in TGA for student gain in math and reading, as measured with the MAP Assessment in Grades K-8, between and among certified teacher demographic variables (gender, degree earned, years of experience, building level) in Grades K-8?

*H3.* Between and among certified teacher demographic variable (gender, degree earned, years of experience, building level) significant mean gain differences were found for math and reading.

A *t* test for independence was conducted to address significant mean gain differences in TGA for student gain in math and reading as measured with the NWEA MAP Assessment in Grades K-8, between and among the teacher demographic variables of gender, degree earned and building level for RQ3. The level of significance was set at .05. Also for RQ3, a one-way analysis of variance (ANOVA) was conducted to test significant mean gain differences in TGA for student gain in math and reading as measured by the NWEA MAP Assessment in Grades K-8, between and among the years of experience teacher demographic variable as divided into three categories.

Two hypotheses were tested for statistically significant differences between teachers' TeacherInsight scores and TGA gain for math and reading as measured by the NWEA MAP Assessment in Grades K-8. The third hypothesis was tested for statistically significant differences between teachers' demographics of gender, degree earned, building level, and experience between and among TGA gain in math and reading as measured by the NWEA MAP Assessment in Grades K-8. These were predictions based upon the research questions.

# Limitations

According to Luneburg and Irby (2008), "limitations are factors that may have an effect on the interpretation of the findings or on the generalization of the results" (p. 133). The limitations of the study included the number of teachers hired in a given year that affected the number of teachers included in the sample. The proctored setting was determined by the NWEA for MAP testing. The amount of effort extended by the students in the testing process was not controlled, nor was it validated through researcher oversight of strict adherence to proctoring rules. The TeacherInsight assessment was conducted online in a non-proctored setting with a limitation of the study being the integrity of the candidate taking the assessment in an unsupervised setting. There were no time constraints on the MAP test, but there were time constraints on the TeacherInsight tool that may have had an effect on outcomes.
# Summary

Chapter three examined the research design used in the study. The population and sample of the current study were newly hired teachers and their students in the district. The instruments selected to provide input to the study and to determine if there was a correlation between newly hired teachers and their students' academic growth were the TeacherInsight assessment and the MAP. The teacher demographics from the same teacher population were used to determine the role between newly hired teacher demographics and their student's academic growth on the MAP. The data collection process and the limitations were outlined. Results and data collected from the various components established in chapter three will be presented in chapter four.

### **Chapter Four**

#### Results

The purpose of this quantitative study was to evaluate the role of teacher TeacherInsight scores and teacher demographics on eventual academic growth of elementary and middle school students in mathematics and reading as demonstrated in the Northwest Evaluation Association MAP. Three research hypotheses were tested by conducting correlation coefficient tests, linear regression analysis, independent-samples *t* tests, and an ANOVA. Chapter four summarizes the data collected, the statistical analyses that were used to test the hypotheses, and the results of the hypotheses testing.

# **Descriptive Statistics**

Luneburg and Irby (2008) defined descriptive statistics as the "mathematical procedures for organizing and summarizing numerical data" (p.63). The population for the study consisted of elementary and middle school teachers hired in 2011 and 2012 who took the Gallup TeacherInsight assessment during 2011-2012 in the district. The sample population consisted of 76 elementary and middle school teachers who taught reading and math to 9,154 students in the district from Grades K-8 who had taken the NWEA MAP exam during the 2011-2012 and 2012-2013 school years.

The four demographic variables used in this study included teacher gender, teacher building level, teacher education level, and teacher experience categories. Teacher gender was individually recorded by gender type, female or male. The JASP software was used to count the number of men and women included in the study. A review of the statistical analysis was reported in JASP output tables. Gender frequency and percentage were computed. It was found that 82.9% (n = 63) of the teachers were female and 17.1% (n = 13) of the teachers were male (see Table 6). This proportion was assumed to be representative of the target population.

Table 6

### Frequencies for Gender

Frequency	%
63	82.9
13	17.1
76	100
	Frequency 63 13 76

The teacher building level variable was obtained from the sample data. The data were organized by the building level, elementary school or middle school. Each building level represents that the teachers were employed at the elementary and middle school level. A review of the statistical analysis resulted in 65.8% (n=50) of teachers teaching at the elementary level and 34.2% (n=26) teaching at the middle school level (see Table 7).

Table 7

Variable	Frequency	%
Elementary School	50	65.8
Middle School	26	34.2
Total	76	100

The teacher degree earned was obtained from the sample data. The degree earned was defined by teachers in the sample population who had only a Bachelor's of Science degree or teachers that also had a Master's of Science degree. The JASP software was used to count the number of teachers with a bachelor or master's degree included in the study. A review of the statistical analysis was reported in JASP output tables. Frequency of bachelor and master's degrees were computed. It was found that 61.8% (n = 47) of the teachers had only a Bachelor's of Science degree and 34.2% (n = 26) had an additional Master's of Science degree (see Table 8).

# Table 8

Frequencies	for	Teacher	Education	Level
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Variable	Frequency	%
Bachelors of Science	47	61.8
Masters of Science	29	38.2
Total	76	100

The teacher experience categories were determined by dividing years of experience into three categories.

- Category 1 included first year teachers.
- Category 2 included teachers with 1 to 9 years of teaching experience.
- Category 3 included teachers with over 9 years of teaching experience.

JASP software was used to count the number of teachers in Categories 1, 2, and 3. A review of the statistical analysis was reported in JASP output tables. Category frequencies were computed (see Table 9).

# Table 9

Variable	Frequency	%
Category 1	35	46.1
Category 2	32	42.1
Category 3	9	11.8
Total	76	100

Frequencies for Experience Categories

*Note.* Category 1 = First year teachers, Category 2 = Teachers with 1-9 years of teaching experience, and Category 3 = Teachers with over 9 years of teaching experience.

# **Hypothesis Testing**

Each research question's hypotheses were tested using a statistical test method. In this section, the test results are listed after each research question.

**RQ1.** Is there an association between Gallup TeacherInsight scores and TGA for

student gain in math and reading as measured with the MAP Assessment in Grades K-8?

H1. Certified K through Grade 8 teacher Gallup TeacherInsight scores are

significantly correlated to TGA math and reading gains as measured with the MAP Assessment in grades.

To test the association between a teacher's Gallup TeacherInsight score and TGA for a student's average RIT gain in math and reading, a Pearson product moment correlation coefficient was calculated using the JASP software to index the strength and direction of the relationship. The level of significance was set at .05. The correlation coefficient (r = .106, p = .361) provided evidence for a weak nonsignificant relationship between Gallup TeacherInisght scores and student TGA gain in reading. The correlation coefficient (r = .103, p = .374) provided evidence for a weak nonsignificant relationship between Gallup TeacherInisght scores and TGA gain in math. As shown in Table 10, the hypotheses were not supported.

Table 10

Correlation Matrix Gallup TeacherInsight Score and TGA

Subject	Pearson's r	<i>p</i> -value
Reading	0.106	0.361
Math	0.103	0.374

*Note*. For a student's average RIT gain in math and reading.

**RQ2.** Can a regression prediction model be identified for the variables Gallup TeacherInsight scores and TGA for student gain in math and reading as measured with the MAP Assessment in Grades K-8?

*H2*. A significant prediction model was found. Certified K through Grade 8 teacher Gallup TeacherInsight scores were found to significantly predict TGA math and reading gains as measured with the MAP Assessment.

Simple linear regression analysis methods utilizing JASP statistical analysis software program were applied to challenge the hypotheses. Summary measures of central tendency and spread results were collected and interpreted. Regression prediction models were found. The models included Gallup TeacherInsight scores and TGA for student gain in math and reading as measured with MAP Assessment in Grades K-8 exists.

The TGA scores for reading (M=7.539, SD=4.509) and Gallup scores (M=76.921; SD=6.691) were computed, as shown in Table 11.

Table 11

Descriptive Analysis Results for Reading

Source	Ν	Mean	SD	SE
TGA Reading	76	7.539	4.509	0.517
Gallup	76	76.921	6.691	0.767

As shown in Table 12, a regression equation (TGA reading = 2.036 + (0.072 \* Gallup score)) that predicts TGA gain for reading scores was constructed. The regression equation was not significant (r = .106,  $R^2 = .011$ , p = .361). The hypothesis was not supported. Gallup scores should not be used to predict TGA gain for reading scores. This observation is based upon a p value of .361, which is greater than .05. The R value (.106) provided evidence for a weak nonsignificant relationship between Gallup scores and TGA gain for reading. The  $R^2$  value accounted for a small percent of the variance (1.1%) which is not practical.

Table 12

Regression Model Summary for Reading

Source	Coefficients	R	$R^2$	<i>F</i> (1,35)	р
Intercept	2.036				
Gallup	0.072	.106	.011	0.844	.361

The TGA scores for math (M = 10.32, SD = 5.804) and Gallup scores (M = M = 10.32, SD = 5.804) and Gallup scores (M = M = 10.32, SD = 5.804) and Gallup scores (M = M = 10.32, SD = 5.804) and Gallup scores (M = M = 10.32, SD = 5.804) and Gallup scores (M = M = 10.32, SD = 5.804) and Gallup scores (M = M = 10.32, SD = 5.804) and Gallup scores (M = M = 10.32, SD = 5.804) and Gallup scores (M = M = 10.32, SD = 5.804) and Gallup scores (M = M = 10.32, SD = 5.804) and Gallup scores (M = M = 10.32, SD = 5.804) and Gallup scores (M = M = 10.32, SD = 5.804) and Gallup scores (M = M = 10.32, SD = 5.804) and Gallup scores (M = M = 10.32, SD = 5.804) and Gallup scores (M = M = 10.32, SD = 5.804) and Gallup scores (M = M = 10.32, SD = 5.804) and Gallup scores (M = M = 10.32, SD = 5.804) and Gallup scores (M = M = 10.32, SD = 5.804) and Gallup scores (M = M = 10.32, SD = 5.804) and Gallup scores (M = 10.32) and Gallup scores (M =

76.921; SD = 6.691) were computed, as shown in Table 13.

Table 13

Source	N	Mean	SD	SE
TGA Math	76	10.32	5.804	0.666
Gallup	76	76.921	6.691	0.767

Descriptive Analysis Results for Math

As shown in Table 14, a regression equation (TGA math = 3.422 + (0.090\*Gallup Score)) that predicts TGA gain for math scores was constructed. The regression equation was not significant (r = .103,  $R^2 = .011$ , p = .374). The hypothesis was not supported. Gallup scores should not be used to predict TGA gain in math scores. This observation is based upon a p value of .374, which is greater than .05. The R value (.103) provided evidence for a weak nonsignificant relationship between Gallup scores and TGA gain for math. As reported above, this regression equation was not practical. The  $R^2$  value accounted for only 1.1%, which is a very small percentage and not practical.

Table 14

Regression Model Summary for Math

Source	Coefficients	R	$R^2$	<i>F</i> (1,35)	р
Intercept	3.422				
Gallup	0.090	.103	.011	0.798	.374

**RQ3.** Is there a mean difference in TGA for student gain in math and reading, as measured with the MAP Assessment in Grades K-8, between and among certified teacher demographic variables (gender, degree earned, years of experience, building level) in Grades K-8?

*H3.* Between and among certified teacher demographic variables (gender, degree earned, building level, and years of experience) significant mean gain differences were found for TGA for student gain in math and reading as measured with the MAP Assessment in Grades K-8.

A *t* test for independence was conducted to address significant mean gain differences in TGA for student gain in math and reading as measured with the NWEA MAP Assessment in Grades K-8, between and among the gender, degree earned, and building level teachers demographic variables. The level of significance was set at .05.

A one-way analysis of variance (ANOVA) was conducted to test significant mean gain differences in TGA for student gain in math and reading, as measured with the NWEA MAP Assessment in Grades K-8, between and among the years of experience teacher demographic variable. The categorical variable used to group the years of experience teacher demographic variable was experience categories.

- Category 1 included first year teachers.
- Category 2 included teachers with 1 to 9 years of teaching experience.
- Category 3 included teachers with over 9 years of teaching experience.

The *t* test for independence was performed comparing TGA math mean difference, as measured by NWEA MAP, between female and male teachers. Contrary to prediction, the TGA gain for math was not dependent on gender. Female teachers (M =

10.635, SD = 4.916, n = 63) outperformed male teachers (M = 8.769, SD = 9.084, n = 13). A mean difference (M-D = 1.866) was found, but the difference was not significant. The H3 was not supported (t(74) = 1.056, p = .294). See Table 15.

Table 15

Math t-Test Results for Teacher Gender Impact on TGA

Gender	N	Mean	SD	M-D	t (df = 74)	р
Female	63	10.635	4.916			
Male	13	8.769	9.084	1.866	1.056	0.294

An independent samples *t* test was performed comparing the mean differences of TGA for reading, as measured by NWEA MAP, between female and male teacher gender. As found in math, TGA gain for reading was also not dependent on gender. Female teachers (M = 7.968, SD = 4.568, n = 63) out performed male teachers (M = 5.462, SD = 3.688, n = 13). A mean difference (M-D = 2.507) was found, but the difference was not significant. The H3 was not supported (t(74) = 1.854, p = .068). See Table 16.

## Table 16

Gender	N	Mean	SD	M-D	t (df = 74)	р
Female	63	7.968	4.568			
Male	13	5.462	3.688	2.507	1.854	0.068

Reading t-Test Results for Teacher Gender Impact on TGA

Following the methods above, a *t* test was performed comparing the mean differences of TGA for math, as measured by NWEA MAP, between teacher degrees earned. Contrary to prediction, the TGA gain for math was not dependent on teacher degree earned. Teachers with a bachelor's degree (M = 11.170, SD = 6.377, *n* = 47) outperformed teachers with a master's degree (M = 8.931, SD = 4.495, *n* = 29). A mean difference (M-D = 2.239) was found, but the difference was not significant. The H3 was not supported (t(74) = 1.653, p = .103). See Table 17.

Table 17

Math t-Test Results for Teacher Degree Earned Impact on TGA

Degree Earned	N	Mean	SD	M-D	t (df = 74)	р
BS	47	11.170	6.377			
MS	29	8.931	4.495	2.239	1.653	0.103

A *t* test was performed comparing the mean differences of TGA for reading, as measured by NWEA MAP, between teacher degrees earned. As found in math, the TGA gain for reading was not dependent on teacher degree earned. Teachers with a bachelor's

degree (M = 8.128, SD = 4.600, n = 47) outperformed teachers with a master's degree (M = 6.586, SD = 4.265, n = 29). A mean difference (M-D = 1.541) was found, but the difference was not significant. The H3 was not supported (t(74) = 1.459, p = .149). See Table 18.

Table 18

Degree Earned	N	Mean	SD	M-D	t (df = 74)	р
BS	47	8.128	4.600			
MS	29	6.586	4.265	1.541	1.459	0.149

Reading t-Test Results for Teacher Degree Earned Impact on TGA

An independent samples *t* test was performed comparing the mean differences of TGA for math, as measured by NWEA MAP, between teacher building levels. As predicted, TGA gain for math scores was dependent on teacher building level. Elementary school teachers (M = 12.740, SD = 3.463, *n* = 50) outperformed middle school teachers (M = 5.654, SD = 6.572, *n* = 26). There was a significant mean difference (M-D = 7.086). The H3 was supported (*t*(74) = 6.174, *p* < .001). See Table 19. Table 19

Building Level	Ν	Mean	SD	M-D	t (df = 74)	р
Elementary	50	12.740	3.463			
Middle	26	5.654	6.572	7.086	6.174	<.001

Math t-Test Results for Building Level Impact on TGA)

An independent samples *t* test was performed comparing the mean differences of TGA for reading, as measured by NWEA MAP, between teacher building level. As predicted, TGA gain for reading scores was dependent on teacher building level. Elementary school teachers (M = 9.740, SD = 4.030, n = 50) outperformed middle school teachers (M = 3.308, SD = .928, n = 26). There was a significant mean difference (M-D = 6.432). The H3 was supported (t(74) = 8.006, p < .001). See Table 20.

#### Table 20

Reading t-Test Results for Building Level Impact on TGA

Building Level	N	Mean	SD	M-D	t (df = 74)	р
Elementary	50	9.740	4.030			
Middle	26	3.308	0.928	6.432	8.006	<.001

A one-way ANOVA was performed comparing the mean differences of TGA for math scores, as measured by the NWEA MAP, between teacher experience categories. Contrary to prediction, the TGA gain for math was not dependent on teacher experience as the one-way ANOVA indicated no significant difference between categories, F = .757, df = 2, 73, p = .473, as seen in Table 21.

Table 21

ANOVA for Average Student Math RIT Change in Teacher Hire Year

Cases	Sum of Squares	df	Mean Square	F	р
Experience Categories	51.36	2	25.68		
Residual	2475.06	73	33.90	0.757	0.473

The means and standard error for each category for this analysis are listed in Table 22.

#### Table 22

Experience for Average Student Math RIT Change in Teacher Hire Year

Experience Categories	Marginal Mean	SE	Lower CI	Upper CI
1	9.771	0.984	7.810	11.73
2	11.250	1.029	9.199	13.30
3	9.111	1.941	5.243	12.98

A follow-up post hoc was not conducted for the mean differences of TGA gain for math between teacher experiences categories because the ANOVA was not significant. The years of teaching experience did not significantly impact gain in math. A one-way ANOVA was performed comparing the mean differences of TGA gain for reading, as measured by the NWEA MAP, between teacher experience categories. As found in math, the TGA gain for reading was not dependent on teacher experience as the one-way ANOVA analysis indicated no significant difference between categories was found, F = .373, df = 2, 73, p = .690, as seen in Table 23.

Table 23

ANOVA for Average Student Reading RIT Change in Teacher Hire Year

Cases	Sum of Squares	df	Mean Square	F	р
Experience Categories	15.41	2	7.703		
Residual	1509.47	73	20.678	0.373	0.690

The means and standard error for each category for this analysis are listed in Table 24.

#### Table 24

Experience for Average Student Reading RIT Change in Teacher Hire Year

Experience Categories	Marginal Mean	SE	Lower CI	Upper CI
1	7.200	0.769	5.668	8.732
2	8.063	0.804	6.460	9.665
3	7.000	1.516	3.979	10.021

# **Summary**

The purpose of this quantitative study was to evaluate the role of teacher TeacherInsight scores and teacher demographics on eventual academic growth of elementary and middle school students in mathematics and reading as demonstrated in the Northwest Evaluation Association MAP. Hypotheses testing was performed and analyzed in this chapter. The results of the correlation testing indicated that there was not a significant relationship between teacher's Gallup TeacherInsight score and TGA for student's average RIT gain in math and reading. It was found that a regression prediction model existed; however, the Gallup TeacherInsight scores should not be used to predict TGA for gain in math and reading scores. The *t* test for independence indicated that TGA for gain in math and reading were not dependent on teacher demographic variables of gender and degree earned. The *t* test for independence did indicate that TGA for gain in math and reading was dependent on the teacher building level demographic variable. The results of the one-way ANOVA indicated that TGA for gain in math and reading was not dependent on the teacher demographic variable of teacher experience. Chapter five describes findings related to the literature, any implications for action, conclusions, and recommendations for possible future research.

#### **Chapter Five**

# **Interpretation and Recommendations**

Public school district administrators across the nation seek to identify and recruit highly effective teachers. At the heart of this search is the association of effective teachers and student achievement. School districts receive many applications for available positions. However, selecting the most effective or potentially effective teachers for these positions in the past has been inconsistent. Human resource departments and school administrators look at many factors and teacher characteristics in the hope to maximize student performance. Human resource departments develop policies and processes used for hiring the best possible teachers. Those processes may include teacher-screening instruments to filter through applicants. This study focused on the Gallup TeacherInsight and teacher demographics available to the district in the hiring of highly effective teachers.

Chapter one of this study presented the background of the study, purpose, conceptual framework, background, and significance of the study. In chapter two, a review of literature was presented regarding teacher perceiver instruments and teacher demographics that contribute to quality teaching. Chapter three presented the research design, methodology, instrumentation, data collection procedures, and statistical analysis of the study. The data were analyzed in chapter four and related findings were discussed. This chapter includes a summary of the study, overview of the problem, purpose statement, research questions, review of methodology, major findings, findings related to literature, implications for action, and recommendations for future research. Concluding remarks summarize this chapter.

# **Study Summary**

The setting for the study was a Kansas school district. The study focused on the Gallup TeacherInsight assessment and teacher demographics to identify highly effective teachers based on the eventual academic growth of their students as measured by a standardized assessment. The teachers in the study were newly hired teachers to the district in 2011 and 2012 that took the Gallup TeacherInsight. The standardized test used in the study was the NWEA (MAP) assessment that measured TGA in the areas of reading and math in Grades K-8.

**Overview of the problem.** The problem addressed in the study is that school districts are facing challenges in selecting an instrument for hiring teachers that could potentially predict student performance on the standardized test measured by the NWEA MAP and maximizing their potential. The challenge is identifying and securing teachers who are most likely to demonstrate consistently excellent teaching therefore maximizing student performance. This study evaluated if the TeacherInsight instrument is sufficient for identifying highly effective teachers. Districts also face the issue of evaluating the role teacher demographics play in affecting student achievement. This study evaluated the relationship between teacher demographics and student performance on the MAP.

**Purpose statement and research questions.** The purpose of this study was to determine the role of TeacherInsight and teacher demographics to select highly effective teachers based on the eventual academic growth of their students as measured by a standardized assessment. The study determined the extent that an association exists between teacher scores on the Gallup TeacherInsight interview administered during 2011-2012 and a growth in student achievement in Grades K-8 as indicated on the

NWEA MAP assessment. Further examined in this study was the relationship between the assessed teacher's gender, degree earned, building level, and years of experience in relation to student achievement in Grades K-8 as indicated on the NWEA MAP assessment. The following research questions were used to guide the study.

- **RQ1.** Is there an association between Gallup TeacherInsight scores and TGA for student gain in math and reading as measured with the MAP Assessment in Grades K-8?
- **RQ2.** Can a regression prediction model be identified for the variables Gallup TeacherInsight scores and TGA for student gain in math and reading as measured with the MAP Assessment in Grades K-8?
- **RQ3.** Is there a mean difference in TGA for student gain in math and reading, as measured with the MAP Assessment in Grades K-8, between and among certified teacher demographic variables (gender, degree earned, years of experience, building level) in Grades K-8?

**Review of the methodology.** This is a quantitative study that evaluated the academic achievement of elementary and middle school students in mathematics and reading as demonstrated in Northwest Evaluation Association MAP. It also evaluated the association between teacher characteristics as delineated by the Gallup TeacherInsight assessment. The sample was the group of newly hired teachers to the district in 2011 and 2012. The second sample group was K-8 students taking the fall and spring MAP assessment. The instrumentation used for the newly hired teachers was the Gallup TeacherInsight assessment. The instrumentation used with the second sample group was

the 2011-2012 fall and spring MAP assessment. Correlation, regression, t test, and oneway ANOVAs were used in the study to address the research questions.

**Major findings.** Results of the study indicated there was no association between Gallup TeacherInsight scores and TGA gain in math and reading as measured with the MAP assessment in Grades K-8. In addition, results of the study indicated there was no statistical significance between teacher demographics of teacher gender, degree earned, and years of experience, between and among TGA gain for math and reading as measured by the MAP assessment in Grades K-8. The study did result in an association between the teacher demographic of teacher building level and TGA gain for math and reading as measured by the MAP assessment in Grades K-8.

Research Question 1 addressed the association between Gallup TeacherInsight scores and TGA for student gain in math and reading as measured by the MAP assessment in Grades K-8. There was a weak nonsignificant relationship between Gallup TeacherInsight scores, and TGA gain in math and reading scores, as measured on the MAP assessment in Grades K-8. The findings showed that Gallup TeacherInsight scores were not associated with TGA gain in math and reading as measured by the MAP assessment. The hypothesis for research question one was not supported.

Research Question 2 addressed the availability of a prediction model that could be used to associate TeacherInsight scores and TGA for student gain in math and reading as measured with the MAP assessment in Grades K-8. While a regression prediction model was found, when the regression equation was used to predict TGA gain for math and reading based on teachers' Gallup TeacherInsight scores, a weak nonsignificant relationship was found.

Research Question 3 addressed the association of teacher demographics to determine if there was a mean difference in TGA for student gain in math and reading as measured by the MAP assessment, based on the teacher demographics of gender, degree earned, building level, and years of experience. Female teachers' students outperformed male teachers' students in the area of math and reading, as measured by the MAP assessment in Grades K-8, but the difference was not significant and the hypothesis was not supported. Teachers', with a bachelor's degree, students outperformed teachers', with a master's degree, students in the area of math and reading, as measured by the MAP assessment in Grades K-8. However, no significant mean difference was found and the hypothesis was not supported. Teacher building level was also analyzed in the study. Results indicated elementary school teachers' students outperformed middle school teachers' students in both math and reading, as measured by the MAP assessment in Grades K-8. There was a significant mean difference in both math and reading and the hypothesis was supported. The analysis of the teacher experience results indicated that there was no significant association between teacher experience and students' performance in math and reading as measured by the MAP assessment in Grades K-8. The hypothesis was not supported.

TeacherInsight was not found to be associated with student score gains. The TeacherInsight should be used with caution and not as a final determiner in selecting highly effective teachers. In addition, the association of teachers' demographics in the areas of gender, degree earned, building level, and years of experience only indicated that the building level demographic was associated with TGA gains in math and reading. The building level demographic to predict TGA gains in math and reading should be used with caution as this is only one single demographic variable.

#### **Findings Related to the Literature**

The focus of the study was to determine if the Gallup TeachInsight instrument was sufficient for identifying highly effective teachers. Teacher demographics were evaluated in the study to see if there was a relationship with student achievement on the MAP. This section contains a review of the results, both similarities and differences, from the study as they relate to the literature.

Research Questions 1 and 2 required the investigation of the Gallup TeacherInsight scores and TGA for student gain in math and reading as measured with the math and reading assessment in Grades K-8. Results from the study indicated there is no connection between teacher Gallup TeacherInsight scores and student achievement in these two areas. While Gallup has done extensive research on the effectiveness of the Gallup TeacherInsight, that information is not readily available. Information from other resources is scarce. In the review of literature in chapter two, there were mixed opinions regarding the effectiveness of the Gallup TeacherInsight as an effective tool for hiring quality teachers.

The Gallup organization has conducted the most research regarding the strength and effectiveness of their tool. According to Gallup, "questions have been thoroughly researched and tested to be sure they identify the best candidate possible" (Gallup, 2010, para. 1). Gallup also indicated that by increasing the number of extremely talented teachers, districts increase the likelihood that students will be engaged in learning and set up for success (Gallup Develop Extreme Teaching, 2016). The results of the Karl Brown (2004) study indicated that administrators perceived teachers hired using the Gallup TeacherInsight instrument as better overall teachers and were more likely to be perceived as effective teachers. On the other hand, Wilson questioned if the research regarding natural ability identified by Gallup TeacherInsight is critical to improving students' performance in reading and mathematics (Wilson, 2009, p. 2).

Research Question 3 was designed to investigate if there was a mean difference in student MAP scores for math and reading between and among the teacher demographic variables of gender, degree earned, building level, and years of experience in grades K-8. Degree-earned results from the study showed that math and reading teachers with a bachelor's degree outperformed teachers with a master's degree. However, the hypothesis was not supported as no significant mean difference found. Results from the study also indicated that years of teaching experience did not significantly impact gain in student math and reading scores and the hypothesis was not supported. In the review of literature, there are mixed opinions supporting the idea that education levels, such as degree earned, and teacher experience influence achievement. According to Heck and Hallinger (2005), the evidence by researchers existed supporting the idea that education levels positively influence student achievement. In addition, Hanushek (1989) in two different studies found a small statistically positive relationship between teacher experience and students achievement. The literature review referenced several other studies, but overall, the findings from the literature review were inconsistent on the impact of teacher experience on student achievement. For example, Murnane and Phillips (1981) concluded that teachers with three or fewer years of experience tend to be less effective than more experienced teachers. Similar to Philips, the study results

indicated there was no significant gain in student math and reading scores for students who had teachers with limited experience, such as category 1, which included teachers with less than 1 year of experience, in the study.

Results of the study regarding the building levels, as outlined in Research Question 3, of elementary and middle schools indicated that TGA gain for math and reading was dependent on the teacher building level. The hypothesis was supported. TGA gain for math and reading resulted in elementary school teachers' students outperforming middle school teachers' students. Research Question 3 did not identify which teacher building level demographic would have resulted in significant TGA gain in math and reading. The results were not supported by the literature. Middle school teachers who had certification in a specific subject and content area did not outperform elementary teachers. However, elementary teachers generally major in elementary education and not in specific content areas. Middle school teachers may be elementary teachers or secondary teachers with majors in specific content areas. The literature review findings were that some secondary teachers with certifications in their content area were better qualified to teach their students and they should perform better. Leinhardt and Smith (1985) investigated the effects of subject matter knowledge on teacher content delivery and student retention of information on 4th to 8th grade students and found that subject expertise significantly affected student retention.

# Conclusions

Results from this study indicated that the TeacherInsight should not be used as a final determiner in selecting highly effective teachers. There were not significant associations between teachers' TeacherInsight scores and TGA gain in math and reading

as measured by the NWEA MAP in grades K-8. Demographics such as gender, degree earned, building level, and years of experience showed limited results on TGA gain in math and reading as measured on the NWEA MAP and should not be used to predict TGA gain. The most significant finding of the study was that elementary school teachers' students TGA gain outperformed middle school teachers' students TGA gain in both reading and math.

**Implications for action.** The findings from this study have potential implications for school district human resources departments and administration involved in the hiring of teachers. School administrators and human resources should exercise caution when hiring a candidate based strictly on their Gallup TeacherInsight assessment score. School districts using the Gallup TeacherInsight assessment scores should not use it as the only factor for granting an interview, but use it in conjunction with other district selection guidelines. Demographics of gender, building level, degree earned, and years of experience should be used cautiously as supplemental information when reviewing candidates for positions. Administrators should hire the best candidate for a particular position based on all information gathered and not just on a specific demographic.

**Recommendations for future research.** This study examined the relationship between the Gallup TeacherInsight and student achievement as measured using the NWEA Map. In addition, other demographics such as gender, degree earned, years of experience, and building level were examined to determine their relationship to student achievement on the MAP.

This study covered a 2-year period and only included newly hired teachers who took the Gallup TeacherInsight assessment. Future research could expand the number of teachers included in the study for a larger population sample over multiple years to provide more data. Additional research could also be done by distinguishing between the scores of first year teachers and the scores of teachers with 10 or more years of experience. Future research could have teachers retake the Gallup TeacherInsight after 5 years to compare results, check for consistency of scores, and reliability and validity of the assessment.

**Concluding remarks.** All teaching candidates seeking a position in a school district are preparing themselves to be the most viable candidate for the school district to which they are applying. The Gallup TeacherInsight assessment can be a viable instrument to use in the hiring process, but should not be the only selection criteria. Caution should also be used in using teacher TeacherInsight scores as a predictor in how students will perform on standardized tests. Candidates, administrators, and human resources personnel should recognize that the TeacherInsight results are only one snapshot of the candidate and do not necessarily capture or represent the whole potential of the candidate. Teacher demographics in the areas of gender, degree earned, building level, and years of experience, when compared to student performance on standardized tests, were also studied to determine if these demographics are relevant when hiring a candidate. There was no significant statistical evidence showing that these demographics impact the hiring process. Findings from this study show that public school district administrators have challenges to find methods, instruments, and other data to aid in the hiring of highly effective teachers that will ultimately impact student performance.

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### Appendices

### Appendix A: Gallup TeacherInsight Sample Teacher Questionnaire

- 1. I think positively, regardless of how difficult the situation is.
  - 1. Strongly Disagree 2. Disagree 3. Neither Disagree nor Agree
  - 4. Agree 5. Strongly Agree
- 2. When student say they want their teacher to be fair, what do you think they mean?

A. The teacher should treat the students all individually.

- B. The teacher should treat all student the same.
- C. The teacher should respect all students.
- D. The teacher should not play favorites.
- 3. As a person, what about teaching is most rewarding to you? (Kirchner, 2008, p.106)

### Appendix B: District Permission Form to Conduct Study

Research Project Summary for Employees				
Principal Investigator's Name: Kerri E. Evans				
School				
Teacher/Administrator Assignment: Assistant Principal				
Phone Number: Email Address:				
Purpose of proposed research: <u>I am currently in the Ed.D program through Baker</u> <u>University</u> . The proposed research is for my dissertation topic.				
<ul> <li>Please check one of the following.</li> <li>Research is for a project for a class</li> <li>Research is for a thesis/project for a master's program</li> <li>x Research is for a dissertation for a doctoral program</li> <li>Research is for another purpose – please describe</li> </ul>				
<u>Request for data for teachers hired in summer of 2011 and 2012</u> . <u>Gallup TeacherInsight</u> <u>Scores</u> .				
Of teachers hired, demographic data (gender, building level, years of experience, step teacher was on when entered district). Of teachers hired, in 2011 and 2012, student MAP scores for fall and spring.				
Name of Institution for which this project is required <u>Baker University</u> Name of course or graduate program <u>Doctor of Education Program of the School of Education</u> Email address for instructor or advisor <u>Dr. Dennis King</u> <u>dking110@mac.com</u> Names of any staff who were consulted about the research:				
Names of any specific schools involved. District wide elementary and middle schools				
<ul> <li>The following information must be included in the description of the project (email submission as attachments is acceptable)</li> <li>Description of research</li> <li>Data collection method and analysis</li> <li>Project timeline</li> <li>Copies of parent permission and copies of any surveys or materials that will be used</li> <li>IRB (if applicable)</li> </ul>				

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Projected end date: <u>Data collection will be completed in the spring of 2013 after the</u> <u>MAP assessments are finalized</u>

When all materials have been received they will be reviewed and you will be notified of approval to begin.

Kerri Evans				
Signature of Applicant				

Signature of Principal

Return to

The purpose of this quantitative, predictive study was to determine the extent that a relationship exists between teacher scores on the Gallup TeacherInsight interview administered during 2011-2012 and student scores in grades K-8 in the areas of math and reading on the NWEA MAP at the suburban Kansas City school district. This study also determined the extent whether a relationship exists between the assessed teacher genders, degrees earned, years of experience, and grade levels taught because these criteria relate to student scores on the MAP.

The student scores were drawn from the classrooms of newly hired teachers to the district. The study will evaluate the students' growth over the school year with the TeacherInsight assessment composite score. The study will evaluate whether teacher scores on the TeacherInsight assessment resulted in greater growth on student MAP scores during the course of the school year. The study will also determine the extent that a relationship exists between the assessed teacher genders, degrees earned, years of experience, and grade levels taught.

The targeted population for the study consisted of newly hired teachers who took the Gallup TeacherInsight assessment during the hiring period of 2011 and 2012 in a suburban Kansas City school district (the district). Students in the sample were selected from grades K-8 and who had taken the Northwest Evaluation Association's (NWEA) Measures of Academic Progress (MAP) exam during 2011-2012 and 2012-2013 school years in the same District. The sample included 99 certified K-8 public school teachers and approximately 3,000+ students. Identities of teachers and students used in the research were confidential and they remained anonymous throughout data collection and stated results of the study. The district itself was comprised of 20 elementary schools and 9 middle schools from which the sample was drawn. The district and schools were never referenced by name in the research study.

Purposive sampling was used in this study with the intent to identify newly hired teachers from 2011 and 2012 in the district. Teachers in the study held Kansas teaching certificates and had taken the TeacherInsight<sup>™</sup> online. The students were selected from kindergarten through eighth grade and were the students of the newly hired classroom teachers. Students in the sample took the (MAP) exam during the 2011-2012 and 2012-2013 school years. The fall and spring MAP scores for the students were used in the subject areas of reading and mathematics.

From: Date: Thu, Jun 26, 2014 at 9:11 AM Subject: Research approval To: "Kerri Evans

Kerri,

Your research proposal has been approved. You may proceed with your project.

Director of Assessment and Research School District

### Appendix C: Proposal for Research to Baker University and Approval



Date: 5/24/16
IRB PROTOCOL NUMBER

(IRB USE ONLY)

#### IRB REQUEST Proposal for Research Submitted to the Baker University Institutional Review Board

I. Research Investigator(s) (Students must list faculty sponsor first)

### Department(s) <u>School of Education Graduate Department</u>

	Name	Signature	
1. D	r. Dennis King	,	Major Advisor
2. D	r. Phillip Messner	,	Research Analyst
3.			University Committee Member
4. Di	r. Brett Potts		External Committee Member

Principal Investigator: Kerri Evans Phone: (919) 675-3755 Email: kerrievans@stu.bakeru.edu Mailing address: 112 Marsh Barton Drive Holly Springs, NC 27540

Faculty sponsor: Phone: Email:

Expected Category of Review: \_\_\_Exempt \_\_X\_ Expedited \_\_\_Full

### **II: Protocol:** (Type the title of your study)

The Identification of Teacher Predictors as They Relate to Student Performance on the Measures of Academic Progress Assessment

#### Summary

This study takes place in a suburban Kansas City, Kansas school district. The targeted population will consist of newly hired teachers who took the Gallup TeacherInsight assessment during the 2011-2012 and 2012-2013 school years in District X. The sample included approximately 99 certified elementary and middle school public school teachers who taught reading and math. The sample also included approximately 2,000 students in grades K-8 who were students of the approximate 99 teachers in the study. The students in the study took the Northwest Evaluation Association's (NWEA) Measures of Academic Progress® (MAP®) assessment during the 2011-2012 and 2012-2013 school years in District X. The students in the study were the students of the teachers that were hired during that time period

The purpose of this study is to evaluate if there is a mean difference in Gallup TeacherInsight scores when disaggregated by gender, degree earned, years of experience, and building level.

The study will also evaluate to what extent certified teacher Gallup TeacherInsight scores predict teacher growth average in math and reading in grades K through 8 on the Northwest Evaluation Association's (NWEA) Measures of Academic Progress® (MAP®) assessment.

The study will also determine if there is a relationship between Gallup TeacherInsight scores and teacher separation.

All math and reading teachers hired in 2011 and 2012 administered the fall and spring Northwest Evaluation Association's (NWEA) Measures of Academic Progress® (MAP®) assessment in math and reading in grades K-8. Archival data from those tests will be used in the study as well as Gallup Teacher Insight scores obtained from District X.

**Briefly describe each condition or manipulation to be included within the study.** There is no condition or manipulation included in this study.

#### What measures or observations will be taken in the study?

There will be no measures or observations taken in this study. It will be based on archived data.

## If any questionnaire or other instruments are used, provide a brief description and attach a copy.

This study does not include the use of additional instruments and/or questionnaires.

#### Will the subjects encounter the risk of psychological, social, physical, or legal risk? If so, please describe the nature of the risk and any measures designed to mitigate that

Subjects will not encounter the risk of psychological, social, physical, or legal risk. Archived data will be used in this study and all participants will be anonymous.

#### Will any stress to subjects be involved? If so, please describe.

Participants will not be subjected to any stress in the study.

## Will the subjects be deceived or misled in any way? If so, include an outline or script of the debriefing.

Subjects will not be deceived or misled in any way.

# Will there be a request for information which subjects might consider to be personal or sensitive? If so, please include a description.

There will not be a request for any personal or sensitive information.

## Will the subjects be presented with materials which might be considered to be offensive, threatening, or degrading? If so, please describe. Subjects will not be presented with materials that could be considered offensive, threatening, or degrading.

### Approximately how much time will be demanded of each subject?

Archival data will be used in the study, so no time will be demanded of subjects.

The teacher data will consist of Gallup TeacherInsight scores from District X for 2011 and 2012, teacher gender, years of experience; degree earned, and grade level.

All math and reading teachers hired in 2011 and 2012 administered the fall and spring Northwest Evaluation Association's (NWEA) Measures of Academic Progress® (MAP®) assessment in math and reading in grades K-8. Archival data from those tests will be used in the study.

### Who will be the subjects in this study? How will they be solicited or contacted? Provide an outline or script of the information which will be provided to subjects prior to their volunteering to participate. Include a copy of any written solicitation as well as an outline of any oral solicitation.

The targeted population will consist of newly hired teachers who took the Gallup TeacherInsight assessment during 2011-2012 in District X. Students in the sample were selected from grades K-8 who had taken the Northwest Evaluation Association's (NWEA) MAP exam during the 2011-2012 and 2012-2013 school years in the District. The sample included approximately 99 certified elementary and middle school public school teachers who taught reading and math. The sample also included approximately 2,000 students in grades K-8 who were students of the approximate 99 teachers in the study. Teacher and student names will not be used in the study. All participants in the study will be anonymous and not identified.

### What steps will be taken to insure that each subject's participation is voluntary? What if any inducements will be offered to the subjects for their participation?

Newly hired teachers were required to complete the Gallup TeacherInsight as mandated by District X. Students in District X in grades K-8 were required to complete the NWEA (MAP) assessment. It is part of the district required assessment program during 2011-2012 and 2012-2013 school years.

### How will you insure that the subjects give their consent prior to participating? Will a written consent form be used? If so, include the form. If not, explain why not.

The data collected for this study was archived for both the student and teacher participants. Both data sets were mandatory for student participation and teacher employment.

## Will any aspect of the data be made a part of any permanent record that can be identified with the subject? If so, please explain the necessity.

No aspect of the data will be made part of a permanent record that can be identified with the subject in this study.

# Will the fact that a subject did or did not participate in a specific experiment or study be made part of any permanent record available to a supervisor, teacher or employer? If so, explain.

Participation will not be made part of any permanent record available to a supervisor, teacher, or employer.

# What steps will be taken to insure the confidentiality of the data? Where will it be stored? How long will it be stored? What will be done with it after the study is completed?

Confidentiality of all data will be maintained. The archival data will be collected and downloaded without any names given from District X. The teacher data will consist of Gallup TeacherInsight scores from District X for 2011 and 2012, teacher gender, years of experience; degree earned, and grade level.

All math and reading teachers hired in 2011 and 2012 administered the fall and spring Northwest Evaluation Association's (NWEA) Measures of Academic Progress® (MAP®) assessment in math and reading in grades K-8. Archival data from those tests will be used in the study.

The data is stored in the district data management system. Data given to the researcher will be kept on a flash drive and will be discarded upon completion of the study.

# If there are any risks involved in the study, are there any offsetting benefits that might accrue to either the subjects or society?

There are no risks in this study.

#### Will any data from files or archival data be used? If so, please describe.

The archival data will be collected and downloaded without any names given from District X. The teacher data will consist of Gallup TeacherInsight scores from District X for 2011 and 2012, teacher gender, years of experience; degree earned, and grade level.

All math and reading teachers hired in 2011 and 2012 administered the fall and spring Northwest Evaluation Association's (NWEA) Measures of Academic Progress® (MAP®) assessment in math and reading in grades K-8. Archival data from those tests will be used in the study.

The data is stored in the district data management system. Data was obtained from District X by going through the district approval process.



Baker University Institutional Review Board

September 1, 2016

Dear Kerri Evans and Dr. King,

The Baker University IRB has reviewed your research project application and approved this project under Exempt Status Review. As described, the project complies with all the requirements and policies established by the University for protection of human subjects in research. Unless renewed, approval lapses one year after approval date.

Please be aware of the following:

- 1. Any significant change in the research protocol as described should be reviewed by this Committee prior to altering the project.
- 2. Notify the IRB about any new investigators not named in original application.
- 3. When signed consent documents are required, the primary investigator must retain the signed consent documents of the research activity.
- 4. If this is a funded project, keep a copy of this approval letter with your proposal/grant file.
- 5. If the results of the research are used to prepare papers for publication or oral presentation at professional conferences, manuscripts or abstracts are requested for IRB as part of the project record.

Please inform this Committee or myself when this project is terminated or completed. As noted above, you must also provide IRB with an annual status report and receive approval for maintaining your status. If you have any questions, please contact me at emorris@BakerU.edu or 785.594.7881.

Sincerely,

*Erin R, Morris PhD* Chair, Baker University IRB

Baker University IRB Committee Susan Rogers PhD Nate Poell MA Joe Watson PhD Scott Crenshaw