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# Accuracy of the TeacherInsight Online Perceiver Tool in Determining the Effectiveness of High Rated and Low Rated Math and Science New Hire Teachers Following One Year and Three Years of Single School District Employment

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ACCURACY OF THE TEACHERINSIGHT  
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SCIENCE NEW HIRE TEACHERS  
FOLLOWING ONE YEAR AND THREE  
YEARS OF SINGLE SCHOOL DISTRICT  
EMPLOYMENT\*

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## 1 Sumario en español

Los objetivos combinados de alistar y reteniendo a maestros efectivos son a menudo difícil de darse cuenta de debido a fluctuar matriculaciones de estudiante y objetivos de clase-tamaño, normas de enseñanza-carga o requisitos, y presupuestal y limitaciones de recurso. Mientras mercado de escuelas y distritos y alista nuevos a maestros brillantes al campo, ellos también, la lucha para mantener estándares profesionales tentadores de desarrollo que retendrían a los maestros más efectivos en el distrito (Guirano, Santibanez, & Daley, 2006). Con el movimiento alto en escuelas, logro de estudiante sufre. El desgaste del maestro ha crecido por 50% durante los últimos quince años. La tasa nacional del movimiento del maestro ha subido a 16,8%. En escuelas urbanas, es más de 20% y, en algunas escuelas y distritos, la tasa de abandono de maestro es realmente más alta que la tasa de abandono de estudiante. Los distritos de la escuela se caen en un ciclo crónico de emplear y reemplazar a maestros mientras que la financiación para desarrollar maestros efectivos son esforzados financieramente (NCTAF, 2003). Los Recursos humanos son desafiados por los hechos sorprendentes de proveer a maestros sumamente efectivos en duro a posiciones de personal.

NOTE: Esta es una traducción por computadora de la página web original. Se suministra como información general y no debe considerarse completa ni exacta.

## 2 Introduction

The combined goals of recruiting and retaining effective teachers are often difficult to realize due to fluctuating student enrollments and class-size targets, teaching-load norms or requirements, and budgetary and resource constraints. While schools and districts market and recruit bright new teachers to the field, they too, struggle to maintain enticing career development standards that would retain the most effective teachers in the district (Guirano, Santibanez, & Daley, 2006). With the high turnover in schools, student achievement suffers. Teacher attrition has grown by 50% over the past fifteen years. The national teacher turnover rate has risen to 16.8%. In urban schools, it is over 20% and, in some schools and districts, the teacher dropout rate is actually higher than the student dropout rate. School districts fall into a chronic cycle of hiring and replacing teachers whereas the funding to develop effective teachers is financially strained (NCTAF, 2003). Human Resources is challenged by the startling facts of staffing highly effective teachers in hard-to-staff positions.

Although states are beginning to take action to recruit and retain skilled teachers, few of those efforts are directed at finding teachers for the students who need them most (Atwell, 2007). Considerable research supports that poor and minority students are more likely to be taught by teachers less qualified as compared to teachers in more wealthy schools and fewer minority students (Carroll, Reichardt, & Guarino, 2000, Darling-Hammond & Youngs, 2002). Urban schools nationwide educate approximately 40% to 50% of the students who are not proficient in English, about 50% of minority students, and 40% of the country's low-income students (Council of Great City Schools, 2000). The report continues to explain that compared to other districts, the urban districts are competing for quality teaching staff while serving students with lower academic achievement scores, greater dropout rates, and a larger population of special needs students to serve in the classroom. The challenge to recruit and retain quality teachers has encouraged many districts, particularly urban districts, to develop strategic recruitment efforts, hiring practices, and retention programs.

## 3 Purpose of the Study

The purpose of this study is to explore the accuracy of the TeacherInsight online perceiver tool (Gallup University, 2007) in determining the effectiveness of high rated and low rated math and science new hire teachers summative appraisal ratings, completed graduate coursework, and retention status following one year and three years of single school district employment.

The study will focus on math and science teacher new hires ( $N = 50$ ) after 1 year and 3 years of single district teacher employment as it compares to the teacher retention rate, teacher summative appraisal rating

scores, level of education at the time of hire, and the Gallup TeacherInsight Perceiver score at the time of hire of math and science teacher new hires ( $n = 14$ ) who rated high, at the time of employment, and math and science teacher new hires ( $n = 36$ ) who rated low, at the time of employment.

#### 4 The Importance of the Study: The Challenge of Teacher Effectiveness

There is little consensus about the confounding criteria that defines teacher effectiveness (National Comprehensive Center for Teacher Quality (NCTQ), 2009). Great achievement in schools relies on the qualities of the teacher. Teachers have a strong influence on students. To consider the power teachers have to influence student achievement and success in school, it is important to identify traits that make a teacher effective in the classroom (Stronge, 2007). An effective teacher can be defined in a variety of ways depending on the situation. There is current debate over teacher effectiveness as measured by student outcomes (National Comprehensive Center for Teacher Quality, 2009). Results in data research reveal conflicting results between the relationship of teacher characteristics and student achievement. It has been shown that not all novice teachers are less capable than more experienced teachers.

Teacher quality is in the center of school reform as the key to improving public education. As government initiatives allow districts to “Race to the Top” to improve education in all areas, school leadership strives to develop and maintain the highest talent of teachers. Teacher quality has a direct effect on the achievement of students and the success of schools (Stronge, 2007). Student achievement suffers when the quality of the teacher does not meet expectations (Editorial Projects in Education, 2009). Trapped in a chronic cycle of teacher hiring and replacement, schools drain their districts financially with limited spending available to allocate resources that could lead to improving teaching quality (Editorial Projects in Education, 2009). Furthermore, an inordinate amount of the school district’s capital – both human and financial – is consumed by the constant process of hiring and replacing beginning teachers who leave before they have mastered the ability to create a successful learning culture for their students (Editorial Projects in Education, 2009).

Large urban school districts are challenged with retaining new teachers in the classroom. The urban schools not only look to recruit the best teachers for the new school year, but also the effective teachers who can withstand the most challenging classrooms that include children at risk of succeeding in school. In April, at the peak of recruitment season, it is common to see that the best new teacher recruits do not fill the vacant classrooms where students need those most. In reference to data collected in 1999-2000 by the National Center for Education Statistics (2001), schools with the highest magnitude of students in poverty, included 47.1% of all new teachers who were hired in the late summer or after the school year had begun. This percentage of new hire, late-start teachers drops to 41.7% in schools with the lowest proportions of students in poverty. The practice of late hiring limits the school districts’ pool of the strongest and most qualified teacher candidates who demonstrate great potential to be successful in an urban school setting.

#### 5 Recruitment and TeacherInsight

As a means of recruiting and retaining the strongest teacher applicants, the research school district invested in the TeacherInsight System by Gallup University. As a progressive recruitment strategy, the Human Resource department incorporated this web-based recruiting tool to identify candidates whose characteristics centered on common themes of effective teaching. Early in the recruitment season, the model is intended to screen teaching candidates who demonstrate strong potential to teach in an urban school setting.

The TeacherInsight System, designed by the Gallup Organization in 2002, has researched more than 30 years of strategic selection and development of teachers. The tool allows school districts to quickly and effectively assess a large pool of applicants during the recruitment and hiring processes of a school district. “Web-based applications are becoming a necessity because they provide the easiest possible access to the human resources office” (Gallup Organization, 2006). The TeacherInsight interview does not replace the personal interviews, but efficiently assesses the best potential teachers. In 2007, Gallup research identified that over 65% of all applicants initial contact with a school district is the district recruiter who influences teacher applicants to apply to the school district (2007). The second most influential recruiting strategy

remains to be the school district's internet site where 64% of teacher applicants are attracted to apply (Gallup Organization, 2007). The personal connections to an applicant and web-based systems form immediate information that is the pathway for strategic teacher recruitment. In 2007, Gallup reported nationally, that 35,810, nearly 13.5% math and science teachers applied for a job in the districts that incorporated the TeacherInsight System (2007). The Gallup organization identifies key recruiting seasons for math and science teachers. Nationally, in 2007, the largest percent of math and science applicants, 35.61%, applied in April (2007). Research data from the TeacherInsight System allows school districts to strategically gauge recruitment efforts for critical shortage areas as well as study applicant trend data to best suit the needs of the district.

The research derived from the TeacherInsight System includes inquiry and applicant questions that allow a district to quantify effective teaching characteristics of an applicant. The TeacherInsight tool provides research-based core themes that centers around talent, skills, knowledge, and strengths for each teacher candidate. The web-based perceiver assessment includes over 50 multiple choice and likert questions formulated from these themes from which the applicant completes within an average of forty-five minutes. The results of the TeacherInsight tool give recruiting administrators a snapshot into the engagement, values, and motivation of an applicant prior to a formal interview. The Gallup organization encourages human resource departments to combine research data and practical strategies to improve recruiting and hiring practices (Gallup 2007).

## 6 Theoretical Framework: Teacher Recruitment and Teacher Retention

Teacher incentives and support influence teacher recruitment. Recruiting New Teachers, Inc. (1999), has identified effective strategies for recruitment that include: teacher induction programs, teacher assistance with state credentialing, loan forgiveness, relocation stipends, and housing assistance. As luring as the recruitment incentives may appear, schools continue to struggle with a teacher retention problem that is draining resources, diminishing teaching quality, and undermining all efforts to close the student achievement gap. As districts look at recruiting practices, retention strategies are just as crucial in the selection and development of effective teachers to fill the classrooms. Teacher retention contributes significantly to various factors of teacher effectiveness. A strong teacher develops and transforms during years of experience while incorporating valuable skills through the professional study and practice of teaching. Teacher retention is the first step to developing teachers to be instructionally sound in the classroom. A school that can sustain a consistent pattern of teacher experience is valuable in the school culture and its organization (Fullan, 2005).

Districts work hard to attract and retain effective teachers. New policies emerge to recognize teachers and strategies to identify good teaching through professional learning communities, collaboration, and professional standards. The Elementary and Secondary Education Act (ESEA), as "reauthorized" by NCLB in 2001, encourages states to identify and address highly qualified teachers in hard-to-fill teaching positions. Title I, Part A, Section 111(b)(8)(C) of ESEA requires that states "ensure that poor and minority children are not taught at higher rates than other children by inexperienced, unqualified, or out-of-field teachers." The American Recovery and Reinvestment Act (ARRA) of 2009 requires states to make progress on education reforms which includes the staffing of effective teachers in every classroom (U.S. Department of Education, 2010). Such strategies have targeted teacher performance pay, stipend for teaching critical shortage areas of math and science, and teacher development programs.

## 7 Recruiting Math and Science Teachers

Math and science teachers leave the profession at a higher rate as compared to other teachers (Arnold, Choy, & Bobbitt, 1993). Teacher shortages in math and science are a concerning reality. In 1994, the National Center for Education Statistics (NCES) indicated that 43% of school vacancies were in mathematics and 32% in science related fields. Math and science teacher shortages are magnified in large urban school districts. In a recent survey of 57 large city school districts, 97.5% reported an immediate demand for high school science teachers, while 95% indicated an immediate demand for mathematics teachers (Council of Great City

Schools, 2000). Teacher quality and teacher effectiveness is greatly impacted by the limited number of math and science teachers qualified to teach. From this crisis, specific programs have been developed to improve the teacher shortage.

In 2000, the National Assessment of Educational Progress (NAEP) examined eighth grade student achievement scores to teacher quality. Results showed eighth grade students whose teachers were certified with a math teaching endorsement had a higher average score on the mathematics assessment than eighth grade students whose teachers were not certified. Students whose teachers had a major or minor in their assigned content area also had higher mathematics scores than students whose teachers had a major or minor in content areas outside of their teaching assignment (Greenberg, Rhodes, Ye, & Stancavage, 2004). Teacher certification in the endorsed subject field of their assignment is a factor among many indicators of an effective teacher. This research supports NCLB provisions that all teachers have sufficient content knowledge and teaching skills in their assigned area (NCLB, 2001).

## 8 Teacher Retention Strategies

The Gallup organization believes that “retention is the back door to recruitment” (2006). Nationally, urban schools present a higher teacher turnover rate which include the teachers who were hired as the best and brightest candidates (Duarte & Smith, 2000). The pipeline of teacher recruitment must include strong systematic strategies that promote teacher retention. Janet Kearney’s study in 2008, examined various recruitment strategies and their affect to the retention rate of teachers in an urban district. Due to the results of studying satisfaction and retention of African American and European American teachers in an urban district, a summation of recruitment strategies were reaffirmed to retain teachers in a large urban district. The study confirmed that the retention rate for African American teachers were slightly higher than that of European American teachers in a large urban district in Nebraska (Kearney, 2008). The research focused on strategies that may help to attract and retain teachers in an urban school district. Retention strategies included various factors such as: class size, early contracts, and competitive salaries (Kearney, 2008). This study suggested that incentives and assistance to teachers may affect the retention rate of teachers (Recruiting New Teachers Inc., 1999).

## 9 New Teacher Induction Programs

Teacher support programs were identified as key support systems beginning in the 1980’s. Not only is it crucial to hire the best and the brightest teacher, but we must also retain them in urban schools (Kearney, 2008). Teacher support strategies target induction programs that have a significant influence on teacher success and teacher retention (Tillman, 2003). Induction programs are designed to help beginning teachers make the transition from “students of teaching” to “teachers of students” (Moskowitz & Stephens, 1997). Teachers have the highest attrition rate of any profession, and the problem needs to be solved within the individual school (Kent, 2004). New teachers may feel isolated and overwhelmed with the new job and as a result leave the position. School leaders must foster support through programs that encourages teachers to deliver high quality, effective instructional practice. Well-designed solutions to the teacher crisis must address all issues and the entire system as a whole (Troen & Boles, 2003). New teacher induction programs and mentoring may only be a temporary solution to teacher shortages. As new teacher induction programs assist novice teachers to evolve professionally, the schools mentoring and support programs are crucial for teachers to feel fulfilled in the teaching profession. Support systems and professional development provide extensions that encourage coaching and mentoring to increase the success of teacher recruitment and retention in the urban districts.

Since teacher turnover plays a critical part in school achievement, districts strive for retention success strategies through formalized new teacher orientation and induction programs. Teacher training programs are focused on giving teachers immediate support to be successful in the classroom. Teacher success encourages teacher retention. When districts manage to retain teachers in the classroom, teacher experience has an

impact on student success in the classroom. Research supports that teacher experience has a direct impact on student achievement during the first five years of teaching (Cavalluzzo, 2004).

School leaders strive to ascertain measurable qualities of teacher effectiveness that promote teacher success in the classroom. Such efforts to support teachers in their role have been implemented in programs such as mentoring, peer coaching, and professional development (Danielson, 2008). The common thread of teacher effectiveness centers on the definition of good teaching. There, in the heart of teaching, lie the factors that create effective teachers in the classroom.

## 10 Teacher Mentoring

Gretchen Givens Generett (2005) characterizes effective new teachers as having a sense of “deep conviction”. Teachers new to the profession are energetic, enthusiastic, and full of optimism to begin their career. As accountability pressures and classroom challenges increase, the hopes of new teachers begin to fade. It is at this time that support plays an important factor in determining the future development and retention of the teacher.

As new teachers benefit from support and additional training, Darling-Hammond, Holtzman, Gatlin, and Heilig (2005) suggests two crucial components to teacher retention strategies: Effective mentors and scheduled release time for professional development. Other research suggests increasing student teaching requirements from one to two semesters, class size reduction, and more training for new teachers to teach in an urban environment (Darling-Hammond et al., 2005). Teachers are encouraged to reflect on their instructional skills, their relationships with the students and their motivation to grow professionally. Mentoring plays a significant role to building relationships among teachers and to encourage and support others to achieve success in the classroom (Generett, 2005). An effective mentor can provide meaningful guidance to develop reflective teaching. The mentor needs to have the training and expertise to nurture the new teacher’s talent and enable the craft of how an effective teacher “thinks” in the classroom. Other factors that need to be in place to maintain an effective mentoring program is: establishing an effective mentor relationship early, building a teaching schedule that allows interaction with the mentor, and pairing the new teacher with a mentor. Urban mentors learn from each other, are encouraged by the experiences of one another, and form their own communities of practice (Bartell, 2004). It is through continual feedback and collaboration where meaningful guidance and progress can be achieved for the new teacher.

## 11 Teacher Performance and Professional Practice

The American Association of School Administrators (AASA) identifies qualities of effective teachers which fall into two categories: (1) management and instructional techniques and (2) personal characteristics. Good teachers are proactive in discipline measures, implementing differentiated instructional techniques, displaying knowledge in their subject area, demonstrating high expectations of themselves and their students, and exuding warmth and care toward their students (Demmon-Berger, 1986). Teacher quality is commonly measured through the use of a comprehensive appraisal system that measures teacher performance. To support and cultivate effective teachers, a structured framework of teacher evaluation can be designed to promote professional learning for teachers. Teacher evaluation systems are often intended to serve the purpose of providing feedback and guidance for improving professional practice (Stronge, 2007). Basic purposes of teacher evaluation focus on improving performance and fulfilling accountability requirements.

## 12 Methodology

The study evaluated newly hired math and science teacher’s summative appraisal rating scores, level of education, and retention status of math and science teacher new hires ( $N = 50$ ) after one year and three years of single district teacher employment compared to the summative appraisal rating scores, level of education, and retention status of math and science teacher new hires ( $n = 14$ ) who rated high, at the time

of employment, on their TeacherInsight Questionnaire after one year and three years of single district teacher employment.

The study also evaluated newly hired math and science teacher's summative appraisal rating scores, level of education, and retention status of math and science teacher new hires ( $N = 50$ ) after 1 year and 3 years of single district teacher employment compared to the summative appraisal rating scores, level of education, and retention status of math and science teacher new hires ( $n = 36$ ) who rated low, at the time of employment, on their TeacherInsight Questionnaire after one year and three years of single district teacher employment.

### 12.1 Participants

The maximum accrual for this study were ( $N = 50$ ) including a naturally formed group of math and science teachers who rated high, at the time of employment, on their TeacherInsight Questionnaire ( $n = 14$ ), compared to math and science teachers who rated low, at the time of employment, on their TeacherInsight Questionnaire ( $n = 36$ ). In regard to the number of participants ( $N = 50$ ) 41 have remained with the research school district after three years.

### 12.2 Research Design.

The two-group posttest-posttest comparative efficacy, design extended in time is displayed in the following notation:

Group 1  $X_1 Y_1 O_1 O_2$

Group 2  $X_1 Y_2 O_1 O_2$

**Group 1 = study participants #1.** Math teacher and science teacher new hires ( $n = 14$ ) with high TeacherInsight Questionnaire ratings.

**Group 2 = study participants #2.** Math teacher and science teacher new hires ( $n = 36$ ) with low TeacherInsight Questionnaire ratings.

**X1 = study constant.** All participants received orientation and induction in the school district through mentoring, staff development, and in-school support and training.

**Y1 = study independent variable, new hire teacher rating, condition #1.** All math and science teacher new hires, with high TeacherInsight Questionnaire ratings.

**Y2 = study independent variable, new hire teacher rating, condition #1.** All math and science teacher new hires, with low TeacherInsight Questionnaire ratings.

**O1 = Study posttest dependent measures.** Following one-year of teaching in the district the following measures were used to determine teacher effectiveness: 1. Summative appraisal ratings; 2. Completed graduate coursework; and 3. Retention status.

**O2 = Study posttest-posttest dependent measures.** Following three-years of teaching in the district the following measures were used to determine teacher effectiveness: 1. Summative appraisal ratings; 2. Completed graduate coursework; and 3. Retention status.

### 12.3 Independent Variable Descriptions

The independent variables for this study were the math and science teachers with high TeacherInsight ratings and low TeacherInsight ratings. Both groups of teachers had one year to three years of teaching experience in the District. At the time of hire, all teachers met the qualifications to teach secondary math or science. All teachers completed the structure interview process by the Human Resource Department. All teachers completed the mandated school research district's training through the New Teacher Orientation and Induction activities upon the first year of employment. All teachers completed the school research district's appraisal process as mandated by the Nebraska Department of Education, Rule 10 guidelines.



## 12.4 Dependent Variable Descriptions

The study's dependent variables are summative appraisal rating scores, completed graduate coursework, and retention status as compared from one to three years of teaching experience in the research school district. All participants received professional development at the time of hire which included new teacher mentoring, new teacher orientation activities, and curriculum professional development activities throughout the first year of employment. All professional development activities are mandated through the Nebraska Department of Education. The District designs the professional development activities to meet NDE requirements which states that all new teachers fulfill twenty-eight hours of professional development.

## 12.5 Research Questions and Data Analysis

The following posttest ending first year compared to posttest-posttest ending third year research questions were used to analyze math and science teacher new hires with high TeacherInsight Questionnaire ratings, at the time of employment, after three years of single district teacher employment measuring (a) results from the Framework for Effective Teaching Planning and Preparation Domain I, Classroom Environment Domain II, Instruction Domain III, Professional Responsibilities Domain IV, and the Overall Summative Appraisal rating scores, (b) completed graduate coursework, and (c) retention status.

# 13 Results

## 13.1 Research Question 1

*Did math and science teacher new hires with high TeacherInsight ratings, at the time of employment, after three years of single district teacher employment lose, maintain, or improve their posttest ending first year compared to posttest-posttest ending third year (a) Planning and Preparation Domain I, (b) Classroom Environment Domain II, (c) Instruction Domain III, (d) Professional Responsibilities Domain IV, and (e) Overall Summative Appraisal rating scores?*

Question 1 was analyzed using a dependent  $t$  test to examine the significance of the difference between teacher new hires with high TeacherInsight Questionnaire ratings posttest ending first year compared to posttest-posttest ending third year in all four domains and the Overall Summative Appraisal rating scores.

Domain I scores were not statistically significant. Math and science teacher new hires with high TeacherInsight Questionnaire ratings at the time of employment who are still in the district after three years maintained their posttest ending first year compared to their posttest-posttest ending third year in all Domain scores.

The Planning and Preparation domain involves a strategic effort of designing and organizing lessons of effective instruction (Danielson, 2008). New teacher induction activities focus on this domain to assist new teachers in effective strategies to design and implement curriculum and instruction. With experience, teachers develop a solid understanding of designing instruction to meet the needs of all learners (Danielson, 2008).

## 13.2 Research Question 2

*Did math and science teacher new hires with high TeacherInsight Questionnaire ratings, at the time of employment, after three years of single district teacher employment maintain or improve their posttest ending first year compared to posttest-posttest ending third year completed graduate coursework?*

Chi-square test of significance compared observed versus expected posttest ending first year compared to posttest-posttest ending third year completed graduate coursework frequencies indicated no significance in continuing education as it pertained to teachers with a high TeacherInsight rating. Although these teachers did not show significant advancement in their level of education, they did show significant growth in their professional responsibilities as it pertained to their job performance.

### 13.3 Research Question 3

*Did math and science teacher new hires with high TeacherInsight Questionnaire ratings, at the time of employment, after three years of single district teacher employment maintain or improve their posttest ending first year compared to posttest-posttest ending third year retention status?*

Chi-square test of significance compared observed versus expected posttest ending first year compared to posttest-posttest ending third year completed retention status frequencies were not significant. Teachers with a high TeacherInsight rating maintained an 87% retention rate after the first year and an 80% retention after their third year in the research school district. Compared to the national average where approximately 33% of teachers leave the profession after three years (The National Commission on Teaching and America's Future, 2003), teachers in this research study with a high TeacherInsight rating, maintained a higher retention rate in the research school district.

### 13.4 Research Question 4

*Did math and science teacher new hires with low TeacherInsight ratings, at the time of employment, after three years of single district teacher employment lose, maintain, or improve their posttest ending first year compared to posttest-posttest ending third year (a) Planning and Preparation Domain I, (b) Classroom Environment Domain II, (c) Instruction Domain III, (d) Professional Responsibilities Domain IV, and (e) Overall Summative Appraisal rating scores?*

Overall, the posttest-posttest results ending third year in all four domains and overall Summative Appraisal ratings statistically significantly improved after three years of employment. Teacher new hires with low TeacherInsight ratings, at the time of employment, after three years of single district teacher employment improved their posttest ending first year and their posttest-posttest ending third year in all four domains and the Overall Summative Appraisal rating scores.

Question 4 was conducted using a dependent *t* test to examine the significance of the difference between teacher new hires with low TeacherInsight Questionnaire ratings posttest ending first year compared to posttest-posttest ending third year in all four domains and the Overall Summative Appraisal rating scores.

Teacher support and mentoring that occur in a well-designed induction program provide an extension from a teacher preparation program (Bartell, 2004). Teacher new hires with a low TeacherInsight rating demonstrated significant gains in their content knowledge and organization of content delivery. As teachers broaden their expertise in planning and designing lessons, they grow in the mastery of curriculum content and best practice (Danielson, 2008).

The posttest ending first year compared to posttest-posttest ending third year Classroom Environment Domain II scores were statistically significant. Math and science teacher new hires with low TeacherInsight Questionnaire ratings at the time of employment who are still in the district after three years strongly improve their posttest ending first year compared to their posttest-posttest ending third year in Classroom Environment Domain II scores.

Classroom environment is one of the most notable skills for a novice teacher to obtain during the first year of teaching (Danielson, 2008). Teacher new hires with a low TeacherInsight rating showed significant growth in strategies such as classroom management, engaging students in learning, and establishing a positive culture in the classroom. The effectiveness of a class environment is the result of how well a teacher manages the classroom (Wong & Wong, 2001).

The posttest ending first year compared to posttest-posttest ending third year Instruction Domain III scores were statistically significant. Math and science teacher new hires with low TeacherInsight Questionnaire ratings at the time of employment who are still in the district after three years significantly improved their posttest ending first year compared to their posttest-posttest ending third year in Instruction Domain III scores.

Instruction, Domain III, pertains to engaging students in learning. Student engagement ensures learning (Danielson, 2008). As the teachers with low TeacherInsight ratings made significant gains in Planning and Preparation, Domain I, and Classroom Environment, Domain II, their effort has influenced performance in

the Instruction Domain III. As Domain I and II set the stage for effective teaching, Domain III is the core of teacher success.

The posttest ending first year compared to posttest-posttest ending third year Professional Responsibilities Domain IV scores were statistically significant. Math and science teacher new hires with low TeacherInsight Questionnaire ratings at the time of hire who are still in the district after three years significantly improved their posttest ending first year compared to their posttest-posttest ending third year in Professional Responsibilities Domain IV scores.

Teachers continue to learn, develop, and perfect their teaching throughout their careers as they interact with students and their colleagues (Darling-Hammond & Youngs, 2002). The results show statistical significance of the teachers with a low TeacherInsight rating to improve in Domain IV, Professional Responsibilities. This may be attributed to the significant growth in all domains in the Framework for Effective Teaching and the desire to practice proven practices as shown through new teacher induction activities and professional development.

The posttest ending first year compared to posttest-posttest ending third year Overall Summative Rating scores were statistically significant in all domains. Math and science teacher new hires with low TeacherInsight Questionnaire ratings at the time of employment that are still in the district after three years improved their posttest ending first year compared to their posttest-posttest ending third year in Overall Summative Appraisal scores.

### 13.5 Research Question 5

*Did math and science teacher new hires with low TeacherInsight Questionnaire ratings, at the time of employment, after three years of single district teacher employment maintain or improve their posttest ending first year compared to posttest-posttest ending third year completed graduate coursework?*

Utilizing a chi-square test of significance to compare observed verses expected posttest ending first year compared to posttest-posttest ending third year completed graduate coursework frequencies, teacher new hires with low TeacherInsight ratings were statistically significant in completed graduate coursework.

Teachers with a low TeacherInsight rating improved in Domain IV, Professional Responsibilities, along with an increase in completed graduate coursework. Together, the teachers may have incorporated graduate coursework to improve their craft as becoming an effective teacher and to grow professionally. Critical reflection encourages teachers to assess the effectiveness of their work and take steps to improve it (Danielson, 2008).

### 13.6 Research Question 6

*Did math and science teacher new hires with low TeacherInsight Questionnaire ratings, at the time of employment, after three years of single district teacher employment maintain or improve their posttest ending first year compared to posttest-posttest ending third year retention status?*

Utilizing a chi-square test of significance to compare observed verses expected posttest ending first year compared to posttest-posttest ending third year completed retention status frequencies, the retention status results of teacher new hires with low TeacherInsight ratings were not statistically significant. The retention rate of the teachers was 97% for the first year and 91% for the third year. The retention rate was higher than the national average which indicates that one-third of new teachers leave the profession after three years of teaching experience (The National Commission on Teaching and America's Future, 2003).

### 13.7 Research Question 7

*Did math and science teacher new hires with high TeacherInsight Questionnaire ratings, at the time of employment, after one year of single district teacher employment compared to math and science teacher new hires with low TeacherInsight Questionnaire ratings, at the time of employment, after one year of single district teacher employment have congruent or different posttest ending first year compared to posttest ending*

*first year (a) Planning and Preparation Domain I, (b) Classroom Environment Domain II, (c) Instruction Domain III, (d) Professional Responsibilities Domain IV, and (e) Overall Summative Appraisal rating scores?*

The posttest ending first year results had congruent posttest ratings in Domain I. There was no statistical difference after one year of single district teacher employment between math and science teacher new hires with high TeacherInsight Questionnaire ratings and math and science teacher new hires with low TeacherInsight Questionnaire ratings.

The posttest ending first year results had congruent posttest ratings in Domain II. There was no statistical difference after one year of single district teacher employment between math and science teacher new hires with high TeacherInsight Questionnaire ratings and math and science teacher new hires with low TeacherInsight Questionnaire ratings.

The posttest ending first year results had congruent posttest ratings in Domain III. There was no statistical difference after one year of single district teacher employment between math and science teacher new hires with high TeacherInsight Questionnaire ratings and math and science teacher new hires with low TeacherInsight Questionnaire ratings.

The posttest ending first year results had congruent posttest ratings in Domain IV.

There was no statistical difference after one year of single district teacher employment between math and science teacher new hires with high TeacherInsight Questionnaire ratings and math and science teacher new hires with low TeacherInsight Questionnaire ratings.

The posttest ending first year results had congruent posttest ratings in the Overall Summative Appraisal ratings. There was no statistical difference after one year of single district teacher employment between math and science teacher new hires with high TeacherInsight Questionnaire ratings and math and science teacher new hires with low TeacherInsight Questionnaire ratings.

The conclusions from the posttest results which included all four domain ratings can be drawn that all math and science teacher new hires participated in the same district-wide induction and mentoring program during their first year of employment. Mandatory monthly New Teacher Meetings and professional development activities were assigned to support all new teachers in math and science as it pertained to instructional strategies and classroom management. Given that all teachers received the same training and support, the teachers in the research school district performed consistently during their first year of employment. The complexity of teaching develops over time, and it is important to consider that all well-prepared novice teachers continue to learn to become effective practitioners (Bartell, 2004). Furthermore, it is the expectation from the research school district, that all beginning teachers demonstrate performance at a minimum, a basic performance level. It is expected that new teachers will show dramatic growth in all areas of proficiency by the third to fifth year of teaching experience. Given that the research school district allows beginning teachers to perform at an average level of performance at the beginning stage of employment, the data may indicate that all new teachers begin at an acceptable level, and then continue to grow at a higher level of performance after the first year of employment.

### **13.8 Research Question 8**

*Did math and science teacher new hires with high TeacherInsight Questionnaire ratings, at the time of employment, after one year of single district teacher employment compared to math and science teacher new hires with low TeacherInsight Questionnaire ratings, at the time of employment, after one year of single district teacher employment have congruent or different posttest ending first year compared to posttest ending first year completed graduate coursework?*

Question 8 utilized a chi-square test of significance to compare observed verses expected posttest ending third year compared to posttest ending first year completed graduate coursework frequencies. For their first year of employment, there was no difference between the teacher groups of pursuing additional education coursework. During the first year of employment, all teacher new hires participated in twenty-eight hours of new teacher professional development meetings centered around planning and preparation techniques, instructional strategies, and effective classroom management strategies. The additional hours of teacher support may have influenced the decisions of new teachers to attend graduate classes in addition to the extra

time spent for district mandated staff development.

### 13.9 Research Question 9

*Did math and science teacher new hires with high TeacherInsight Questionnaire ratings, at the time of employment, after one year of single district teacher employment compared to math and science teacher new hires with low TeacherInsight Questionnaire ratings, at the time of employment, after one year of single district teacher employment have congruent or different posttest ending first year compared to posttest ending first year retention status?*

Question 9 utilized a chi-square test of significance to compare observed verses expected posttest ending first year compared to posttest ending first year retention status frequencies. All teacher new hires maintained a high retention rate after their first year of employment in the research school district. In comparison, teachers with a low TeacherInsight rating showed a higher retention rate of 97% in their first year compared to teachers with a high TeacherInsight rating that had an 87% retention rate after their first year of employment in the research school district. The rates in both teacher groups are higher than the national average of approximately 25% of teachers who leave teaching in the first year. Teacher mentoring and induction programs may influence the rate of which teachers choose to stay in the research school district.

### 13.10 Research Question 10

*Did math and science teacher new hires with high TeacherInsight Questionnaire ratings, at the time of employment, after three years of single district teacher employment compared to math and science teacher new hires with low TeacherInsight Questionnaire ratings, at the time of employment, after three years of single district teacher employment have congruent or different posttest-posttest ending third year compared to posttest-posttest ending third year (a) Planning and Preparation Domain I, (b) Classroom Environment Domain II, (c) Instruction Domain III, (d) Professional Responsibilities Domain IV, and (e) Overall Summative Appraisal rating scores?*

Question 10 was analyzed utilizing an independent  $t$  test to examine the significance of the difference between teacher new hires with high TeacherInsight Questionnaire ratings posttest-posttest ending third year compared to teacher new hires with low TeacherInsight Questionnaire ratings posttest-posttest ending third year in all four domains including the Overall Summative Appraisal rating scores.

The posttest-posttest ending third year results for the math and science teacher new hires with high TeacherInsight Questionnaire ratings and low TeacherInsight Questionnaire ratings were not statistically significant.

The posttest-posttest ending third year results for the math and science teacher new hires with high TeacherInsight Questionnaire ratings and low TeacherInsight Questionnaire ratings were not statistically significant.

The posttest-posttest ending third year results for the math and science teacher new hires with high TeacherInsight Questionnaire ratings and low TeacherInsight Questionnaire ratings were not statistically significant.

The posttest-posttest ending third year results for the math and science teacher new hires with high TeacherInsight Questionnaire ratings and low TeacherInsight Questionnaire ratings were not statistically significant.

The posttest-posttest ending third year results were congruent for the math and science teacher new hires with high TeacherInsight Questionnaire ratings and low TeacherInsight Questionnaire ratings for Overall Summative Appraisal scores. Results were not statistically significant.

### 13.11 Research Question 11

*Did math and science teacher new hires with high TeacherInsight Questionnaire ratings, at the time of employment, after three years of single district teacher employment compared to math and science teacher*

*three years of single district teacher employment have congruent or different posttest-posttest ending third year compared to posttest-posttest ending third year completed graduate coursework?*

The posttest-posttest ending third year results were not statistically significant. Teacher new hires with high TeacherInsight Questionnaire ratings and teacher new hires with low TeacherInsight Questionnaire ratings, at the time of employment, maintained their completed graduate coursework status. The teacher new hires with high TeacherInsight ratings and teacher new hires with low TeacherInsight ratings were congruent in completed graduate coursework. Overall results were not statistically significant.

Inferential analysis utilized a chi-square test of significance to compare observed verses expected posttest-posttest ending third year compared to posttest-posttest ending third year completed graduate coursework frequencies. In the graduate coursework levels, teachers with a low TeacherInsight rating had greater frequencies in the Master level and Master+30 level of education as compared to teachers with a high Teacherinsight rating. Teachers who are passionate about their subject will want to be proficient in their subject matter, and find new ways to teach (Fried, 1995).

### **13.12 Research Question 12**

*Did math and science teacher new hires with high TeacherInsight Questionnaire ratings, at the time of employment, after three years of single district teacher employment compared to math and science teacher new hires with low TeacherInsight Questionnaire ratings, at the time of employment, after three years of single district teacher employment have congruent or different posttest-posttest ending third year compared to posttest-posttest ending third year retention status?*

The posttest-posttest ending third year results were not statistically significant. Teacher new hires with high TeacherInsight Questionnaire ratings and teacher new hires with low TeacherInsight Questionnaire ratings, at the time of employment, maintained their retention status.

Utilizing a chi-square test of significance to compare observed verses expected posttest-posttest ending third year compared to posttest-posttest ending third year retention status frequencies, both groups of teachers maintained a high retention rate after the third year of employment. Overall, the research school district has maintained an 87% retention rate which is a higher average for urban school districts.

## **14 Assumptions of the Study**

For the purpose of this study, it was assumed that a variety of factors contribute to the development of teacher effectiveness. The Gallup TeacherInsight tool (2007) is used during the research school district's online teacher application process. It is the expectation that a teacher with minimal teaching experience will improve in the practice of pedagogy and instructional skills through district supported professional development. Through years of teacher experience, it is the expectation that teachers improve in professional practice to a proficient level of performance. Teacher evaluation is the quality indicator to improve teacher performance (NDE, Rule 10, 2010).

The research school district's summative appraisal rating scores are designed using Charlotte Danielson's research that was used to develop the District's Framework of Effective Teaching (1996). Because all appraisers are thoroughly trained to use Charlotte Danielson's adapted Framework of Effective Teacher Appraisal tool, it is assumed that the rating scores are completed with consistency and inter-rater reliability.

## **15 Delimitations of the Study**

The study was delimited to full-time math and science teachers hired by an urban school district in 2005. Previous to hire, all participants included in the study have completed the TeacherInsight Questionnaire, an online interview assessment tool, designed by the Gallup Organization (2006). The questionnaire assesses an applicant's talent of teaching in the areas of an applicant's motivation to teach and the relationship skills with regard to teacher effectiveness.

The summative appraisal rating score may differ due to the variance of appraiser rating styles. As the teacher summative evaluation is connected specifically to defined objectives and criteria, human perception or bias may influence the overall performance rating of a teacher.

## 16 Limitations of the Study

This exploratory study was confined to math and science teachers who have one to three years of teaching experience in the research school district. Due to a math and science teacher shortage, the sample size is limited to teachers who are employed to fill a critical shortage area in the education workforce. As a standard practice, the TeacherInsight (Gallup University, 2007) score allows the hiring administrator to identify the strongest candidate for a teaching position. The retention rate of each teacher may also rely on the quality of the mentoring experience which may support the retention that has not been controlled for in this study.

The conclusion can be drawn that teacher new hires with low TeacherInsight ratings demonstrated a significant difference in performance ratings for all appraisal domains after three years of employment. Given the teacher new hires with low TeacherInsight ratings showed a significant difference in appraisal ratings in all four performance domains, yet the data showed not statistical significance between teacher new hires with a high and low TeacherInsight rating, marks the growth of teacher new hires with a low TeacherInsight rating at year three.

As they made significant growth in all areas, the appraisal rating scores were comparable to teacher new hires with high TeacherInsight ratings by the third year. This may be attributed to the growth teachers with a low TeacherInsight rating performed from year one to year three. For teachers, high-quality professional development activities are necessary tools for improving teacher effectiveness. It is not an end product, but rather an on-going process to improve effective practice (Stronge, 2007). Overall, the data can depict that teachers with a low TeacherInsight rating have the same performance level of Planning and Preparation (Domain I), Classroom Environment (Domain II), Instruction (Domain III), and Professional Responsibilities (Domain IV), as compared to teachers with a high TeacherInsight rating.

## 17 Discussion

The purpose of this study was to explore the accuracy toward the quality of math and science teachers using the TeacherInsight online perceiver tool designed by Gallup University (2007) that identifies effective traits of a teacher. Using the TeacherInsight tool to recognize qualities of an effective teacher, the study compared other factors that contribute to teacher effectiveness as it pertains to the teacher retention rate, summative appraisal rating scores, and completed graduate coursework. Overall, the study results showed significance in the growth of teachers with a low TeacherInsight rating after three years of employment. There was no significant difference for teachers with a high TeacherInsight rating in the performance domains of Planning and Preparation, and Instruction. However, teachers with a high TeacherInsight rating made significant growth in the Domain II, Classroom Environment, and Domain IV, Professional Responsibilities. Only teachers with a low TeacherInsight rating made a statistical difference in their participation of graduate coursework after three years with the district. Both groups of teachers maintained a consistent rate of retention in math and science which was higher than the research school district's overall average. There was no statistical difference between teachers with a high or a low TeacherInsight rating when compared to performance ratings after the first and third year of teaching.

To consider the power teachers have to influence student achievement and success in school, it is important to identify traits that make a teacher effective in the classroom (Stronge, 2007). The Framework for Effective Teaching, includes research-based criteria as a measurement tool to evaluate teacher performance. The Framework for Effective Teaching is a roadmap for teachers to gauge consistent behaviors or practices that promote student engagement and achievement. It is through the Framework for Effective Teaching that teachers can identify effective qualities as well as areas to improve professionally.

The TeacherInsight System is a recruitment tool designed to identify teachers who possess high talent in various teaching skills. The research indicated no significant gains in overall performance for teachers with

a high TeacherInsight score in the first and third year of district employment. Although teachers with a low TeacherInsight score did not show significant progress in the first year of employment, these teachers made significant growth in performance by their third year of experience in the research school district. Teachers with a high TeacherInsight rating and a low TeacherInsight rating showed comparable performance scores by the third year of employment.

The professional development activities are crucial for the growth and success of teachers in the research district. Novice teachers begin at varying stages in their professional career. Induction and mentoring programs provide extensive support to help teachers gain proficiency in performance levels and overall success in the classroom. Educators who continuously stay focused on developing their career as a professional educator will enhance their career as well as make a greater impact on their effectiveness as a teacher (Wong & Wong, 2001). Professional development plays a crucial role in the success of teacher performance. The research group who scored low on the Gallup perceiver tool, showed gains in their performance in a three year period. Retention efforts are crucial during the first three years of teacher employment. Our inability to support high-quality teaching in many schools is driven not by too few teachers entering the profession, but by too many leaving, that is, by an astounding teacher turnover and attrition rate (NCTAF, 2003). Data from the National Center for Education Statistics for the 1999-2000 school year, estimated that nearly one-third of America's teachers resign during their first three years of teaching, and almost one-half of new teachers leave after five years. The research depicted an above average retention rate for math and science teachers. The research also showed that as the teachers continued in their position, they showed growth in their performance in the first three years (NCTAF, 2003).

To recruit and retain the strongest teacher applicants, the research school district invested in the TeacherInsight System by Gallup University. As a progressive recruitment strategy, the Human Resource department incorporated this web-based recruiting tool to identify candidates whose characteristics centered on common themes of effective teaching. Early in the recruitment season, the tool is intended to screen for teaching candidates who demonstrate strong potential to teach in an urban school setting. This study included two groups of math and science teachers who rated high or low on the TeacherInsight Questionnaire. The TeacherInsight tool indicates that teachers who rated high on the perceiver tool had a greater potential to possess effective teaching qualities and the potential to be more successful teaching in an urban setting. This research study indicated that both groups of math and science teachers received congruent appraisal performance ratings by the third year of teaching based on Charlotte Danielson's Framework for Effective Teaching. In comparison to the TeacherInsight perceiver tool, the Framework for Effective Teaching includes fifty-seven specific, research-based criteria to measure teacher performance. The ability to measure teacher effectiveness will support the achievement of schools and students (Danielson, 2008).

Although teacher effectiveness is difficult to measure, it remains at the forefront of national teacher reform. Many characteristics attribute to teacher quality. Harry Wong (2001) cites that an effective teacher has (1) positive expectations for students, (2) has good classroom management, and (3) knows how to design lessons for student success. Shellard and Protheroe (2000) studied specific teacher behaviors that were related to highly engaged classrooms and students. Four case studies revealed key behaviors of the teachers which included strong organizational and planning skills, instructional strategies implemented by sound professional development training, differentiated instruction, and strong interpersonal, interactive skills by the teacher. As many studies depict key characteristics of an effective teacher, it is important to incorporate further studies that impact the success and achievement of students in the classroom. As Sanders & Horn (1998) site in their research, classroom teachers, by a margin of 43%, have the greatest impact for student achievement. Studies need to continue to focus at identifying teachers who have a direct impact on student success. As perceiver tools allow school districts to identify highly talented teacher candidates, it is through district support and professional development where the teachers can truly master their skills of effectiveness in the classroom.



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