



Strategic Teacher Compensation: The Effects on Teacher Quality

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Spring 2018

Abstract

A review of the literature indicates that public school districts, especially those in rural areas, are heavily dependent upon a traditional salary schedule. This may have prevented these districts from leveraging incentives to retain high-performing teachers. This study examines the effects of strategic teacher compensation on teacher quality as determined by the Tennessee Value-Added Assessment System (TVAAS). An independent-sample *t* test was used to evaluate the differences in TVAAS single-year individual teacher index results between teachers who voluntarily elected to participate in the district's new strategic compensation plan as compared to teachers who elected to remain compensated by the traditional salary schedule. The study found statistically significant higher TVAAS single-year individual teacher index results of strategic compensation plan participants as compared to non-participants who remained compensated by the traditional salary schedule.

Keywords: Compensation, Strategic Planning, Retention, Teacher Salary

Introduction

How school district funds are allocated and spent ultimately shapes a district's ability to achieve its overarching goals for increasing student performance (Strategic compensation in education: Reflections and results, 2010). Most school districts in America spend a minimum of 55% of their district's budgets on compensation payments to teachers alone (Podgursky & Springer, 2011). Therefore, considering how compensation is used to accomplish strategic alignment of resources is

increasingly more important in today's competitive and economically challenged workplace (Podgursky, 2008).

Well-designed strategic compensation programs look to holistically change the entire teaching and learning experience. Podgursky (2008) stated that the traditional salary scale suppresses pay differentials that are based on teaching certifications because all teachers earn the same base pay in a traditional salary scale regardless of a teacher's credentials. Thus, a second-grade teacher earns the same pay as a high school chemistry teacher with the same level of education and experience, even though the high chemistry teacher is teaching in a high need area.

Mahoney (2010) stated that ensuring equity for all students is difficult for school district administrators as accountability is becoming increasingly more important. Hanushek and Rivkin (2004) identified the concern that current school accountability systems fail to relate anyone's job to student performance, adding that teachers are merely responding to the incentives that are currently imposed upon them by the traditional salary scale. School districts, especially those from small, rural areas, may benefit from revised employment policy and legislative flexibility that promote the redesign of the traditional salary scale for one that provides differentiated compensation levels for market-based or hard-to-staff teaching positions. Improved pay could potentially attract and retain more qualified teachers, especially in the areas of secondary mathematics, science, and special education.

Literature Review

Hanushek and Rivkin (2004) made estimates of teacher performance and suggested that having 5 consecutive years of good teachers (one standard deviation above the average or at the 85th quality percentage) could overcome the average seventh-grade mathematics achievement gap between lower income students (those on free and reduced lunch) and those from higher income families. Springer and Gardner (2010) concluded that research findings have focused education stakeholders and policymakers on the singular importance that teacher quality has on student learning.

Eberts, Hollenbeck, and Stone (2002) stated the public discontent concerning the performance of public elementary and secondary schools in raising student achievement is greater than in previous years. In response to this growing discontent, Eberts et al., found that as the interest in education reform becomes more prevalent, many reformers are advocating incentive-based rewards that incorporate more teacher accountability to improve schools. Podgursky and Springer (2007b) observed that state accountability systems induced by No Child Left Behind, coupled with poor relative performance of American students on international math and science tests, have also stimulated a greater interest in performance-pay related policy.

Tennessee began using the William Sanders model in the early 1990s, called the Tennessee Value-Added Assessment System (TVAAS) (Eckert & Dabrowski, 2010). Sanders (2003) stated that the value-added system is designed to annually test all students in Grades 3 through 8 in mathematics and reading. According to Eckert and Dabrowski, TVAAS is one of the most sophisticated and respected value-added models that has been expanded to include science and social studies as well as high school core subjects. In the state of Tennessee's efforts to receive Race To The Top

funds from the U.S. Department of Education, Tennessee passed legislation that requires 35% of a teacher's evaluation to be based on TVAAS data (U.S. Department of Education, 2011).

Eckert and Dabroski credited his value-added methods in advancing the concept of expanding student growth beyond the traditional snapshot to using value-added to gauge teacher effectiveness. The Tennessee value-added system tracks student achievement in Grades 3 through 8 to determine the student growth trajectory and then compares the growth against the trajectory (Tennessee Department of Education, 2016a). The Tennessee Department of Education stated that an expected year's growth is given a C on the state report card while above exceeding expected growth by 0.7 is awarded a B and exceptionally exceeding expected growth by 1.2 is awarded an A on the state report card. Eckert and Dabroski (2010) explained that school value-added grades are released to the media by letter grades and individual teacher effect scores are submitted to the teacher and the school principal by computer printout.

McKinsey and Company (2010) reported that only 23% of new teachers in the United States come from the top third of their college classes, and only 14% of those new teachers will teach in high-poverty schools. Podgursky and Springer (2007a) noted that any policy that can recruit and sustain quality teacher performance in the upper tail of the distribution and enhance or cancel out teachers in the lower tail, possesses the potential for substantial impact on student growth. Economist Edward Lazear (2003) wrote that in the absence of externalities or information problems such as data, payments for teacher outputs always trump payments inputs in terms of raising overall teacher quality. Murnane and Cohen (1986), found that successful merit pay systems must provide convincing answers to the two questions posed by workers: (a) Why does Worker X get merit pay and I do not, and (b) What can I do to get merit pay?

Research by Goldhaber, DeArmond, Player, and Choi (2008) noted that greater performance information to teachers by providing transparent answers to the two questions posed by Murnane and Cohen (1986) increased the likelihood of successful implementation in districts that choose merit pay. Even opponents of merit pay identified in the Murnane and Cohen research reported that successful merit pay programs have been revised several times. Podgursky and Springer (2007a) stated that economic literature suggests that incentives may work better when implemented in small teams because the mutual monitoring is coupled with an easy flow of information among team members. Researchers Goldhaber et al. (2008) concluded that districts are more likely to use merit pay when the influences of teachers' unions have been weaker and more when performance data is readily available to teachers. Podgursky and Springer (2007a) concluded that research findings demonstrated that it was useful to have multiple indicators in pay for performance systems, such as team incentives to help ensure that having too few indicators will not be equally susceptible to gaming, a concern of researchers Berliner and Nichols (2007), Goldhaber et al. (2008), Gratz (2010), Murnane and Cohen (1986), and Tienken (2011).

Discussion

The primary purpose of this study was to examine the quantitative effects that strategic compensation had on teacher quality as determined by individual teacher effect (value-added growth) results. Using data provided by the Tennessee Value-Added Assessment System, or TVAAS, the researchers were looking for a relationship between strategic compensation and student learning in a small rural school district. TVAAS is a statistical method of determining the effectiveness of school systems, schools, and teachers. TVAAS uses a statistical mixed-model theory and methodology to enable multivariate and longitudinal analysis of student achievement data (Sanders & Horn, 1994). TVAAS measures the impact schools and teachers have on their students' academic progress, not whether the student is proficient on the state assessment (Tennessee Department of Education, n.d). The small rural school district's TVAAS teacher effect results were examined for the 2011-12, 2012-13, 2013-14, and 2014-15 school years.

Comparisons were analyzed to examine data from teachers who participated in the small rural school district strategic compensation model as compared to data from teachers who elected not to participate in the voluntary strategic compensation plan, which was funded by the Innovation Acceleration Fund through Tennessee's Race To The Top grant (Tennessee State Government, 2011).

Participants

Potential participants for the study included 134 teachers employed by the small rural school district during a four-year period from 2011-2015. All teachers employed during the 2011-12 school year were eligible to voluntarily pilot the small rural school district's strategic compensation plan with the option of returning to the original state salary schedule prior to the 2012-13 school year without loss of salary or benefits. All new teachers employed during the 2012-13 school year or beyond were required to enroll in the small rural school district's strategic compensation plan upon initial employment. Subjects included 42.5% of the total population of both participant and nonparticipant teachers that had annual TVAAS single-year individual teacher index results for Reading/English Language Arts and Mathematics in Grades 3-5 and Reading/English Language Arts, Mathematics, Science, and Social Studies in Grades 6-12 during any of the years included in the study. Teachers determined not to have individual teacher effect results during any of the school years included in the study were eliminated.

Research Procedures and Data Collection

TVAAS furnishes each Tennessee school district with value-added information for Grades 3-8 in Reading/Language Arts, Mathematics, Science, and Social Studies by using the scale scores from the TCAP. TVAAS also provides subject-matter-specific comparable data for Grades 9-12 in the subjects of Algebra I, Algebra II, Biology I, English I, English II, English III, and U. S. History. Individual teacher effect data, which reports the rate of student learning, is reported to the teacher, appropriate administrators, and school board members, but not to the public (McLean & Sanders, 1984). Estimates of specific teacher effects on the educational progress of students will not be public record and will be made only to the specific teacher, the teacher's appropriate administrators as designated by the local board of education and school board members. Each institution receiving the estimates shall develop a policy to protect the confidentiality of data (Tennessee Code Annotated, 2015, 49-1-606). The

procedures for TVAAS single-year individual teacher effect index results collected for the study were conducted by the small rural school district's testing coordinator to ensure confidentiality and to eliminate potential researcher bias. The researcher collected the small rural school district's strategic compensation participation rates including teacher demographics from the 2011-12, 2012-13, 2013-14, and 2014-15 school years. Teacher information was collected to protect anonymity.

An independent samples *t* test was used to determine the potential difference in means between TVAAS single-year individual teacher index results of teachers who participated in the small rural school district's strategic compensation plan and TVAAS single-year individual teacher index results of teachers who did not participate in the small rural school district's strategic compensation plan. The independent samples *t* test compared 4-year TVAAS single-year individual teacher index results from the 2011-12, 2012-13, 2013-14, and 2014-15 school years. All teachers that had individual teacher effect results for Reading/English Language Arts and Mathematics in Grades 3-5 in addition to Reading/English Language Arts, Mathematics, Science, and Social Studies in Grades 6-12 during the any of the 2011-12, 2012-13, 2013-14, and 2014-15 school years were utilized for the study. The latest version of SPSS was used for the analysis.

Limitations

Results can only be summarized for the population used within the study. Variations of strategic compensation plans among different districts and states prevent the study from being widely generalizable to other school districts. Additionally, the small sample size of 134 teachers, of which only 42.5% of teachers had individual teacher effect (value-added) data, in a district of less than 1,300 students also inhibits results from this study being generalizable to larger school districts and teacher populations.

The quantitative design of this study did not account for qualitative factors that influence teacher quality and, in turn, student learning, therefore, minimizing the strength of conclusions the researcher interpreted. Because the quasi-experimental design did not provide for full manipulation of the independent variables, the reader should consider the internal and external threats to validity.

Results

The participants in this study consisted of the entire population of 134 teachers employed by the small rural school district during the 2011-12, 2012-13, 2013-14, and 2014-15 school years. All teachers employed during the 2011-12, 2012-13, 2013-14, and 2014-15 school years were eligible to voluntarily participate in the small rural school district's strategic compensation plan either by transfer from the original traditional salary schedule or by accepting initial employment beginning in the 2011-12 school year. Table 1 provides an overview of the percentage of strategic compensation plan participant and nonparticipant teachers who voluntarily selected the new strategic compensation plan or the existing traditional salary schedule.

Table 1
Strategic Compensation Participation of Teachers

Participation	Frequency	Percent
Participant		69.0
Nonparticipant		31.0
Total		100.0

Overall, during the 2011-12, 2012-13, 2013-14, 2014-15 school years, 69% of the teachers voluntarily elected to join the new strategic compensation plan as compared to 31.0% who elected to remain with the traditional salary schedule.

Table 2 provides the percentage of teachers that was assessed by TVAAS in Grades 3-12 and, therefore, obtained a single-year individual teacher index result in either of the core subjects of Reading/English Language Arts and Mathematics, or Science and Social Studies in Grades 6-12.

Table 2
TVAAS-Assessed Teachers

	Frequency	Percent
Teachers assessed		42.5
Teachers not assessed		57.5
Total		100.0

Note. TVAAS = Tennessee Value-Added Assessment System.

During the 4-year duration of the study, 42.5% of the teachers in Grades 3-12 were assessed via TVAAS, therefore yielding single-year individual teacher effect index scores for each year they were employed with the school district between 2011 to 2015. Table 2 identifies that 57.5% of the teachers in this study were not assessed and did not receive a single-year individual teacher effect score at any time during the duration of the 4-year study.

An independent samples *t* test was conducted to examine the differences in TVAAS results between teachers who participated and teachers who did not participate in the strategic compensation plan. Levene's test evaluated the assumption that the population variances for the two groups were equal. The variances were very similar and, consequently, the standard *t* test, $t(181) = 2.738, p < .00$, and the *t* test for

unequal variances, $t(45.058) = 3.753, p < .00$, yielded comparable results. Since the variances for the two groups were not different, but the sample sizes were different, the t value that did assume equal variances was reported, thereby, meeting the homogeneity of variances assumption. Teachers that participated in the strategic compensation plan ($M = 1.90, SD = 3.23$) reported significantly higher TVAAS single-year individual teacher index results than teachers who did not participate in the strategic compensation plan ($M = 0.07, SD = 2.07$), $t(181) = 2.738, p < .00$; therefore, the null hypothesis was rejected (see Figure 1.). The 95% confidence interval for the differences in means was marginal, ranging from [.84571 to 2.80485]. The effect size of 0.32 was medium.

Conclusions and Future Study

The results of this study indicated that there was a significant difference in TVAAS single-year individual teacher effect (value-added) index results for teachers who participated in the small rural school district strategic compensation plan as compared to teachers who did not participate in the small rural school district strategic compensation plan. Teachers who participated in the small rural school district's strategic compensation plan had higher mean TVAAS single-year individual teacher index results than teachers who did not participate in the small rural school district's strategic compensation plan. Teachers who participated in the small rural school district's strategic compensation plan were more effective at yielding higher student growth results as determined by TVAAS than teachers who did not participate.

These findings supported goals outlined in the Innovation Acceleration Fund grant funded through Race To The Top with which the small rural school district was originally awarded. Strategic goal plan objectives specifically sought to increase value-added gains in reading and mathematics by exhibiting growth gains that were equal to or greater than the growth standard. Mean TVAAS index scores of strategic plan participants ($M = 1.90$) exceeded those of nonparticipants ($M = .07$). When comparing mean TVAAS single-year individual teacher index scores of strategic compensation plan participants with mean TVAAS single-year individual teacher index scores of nonparticipants, strategic compensation plan participants exceeded those of nonparticipants by a difference of 1.83 index points during the duration of the 4-year study. In defining TVAAS effectiveness categories based on the value of the growth index (Tennessee Department of Education, 2016b), strategic compensation plan participants would be designated as Level 4 (1.90) as compared to nonparticipants, who would be designated as a Level 3 (.07). Since a Level 3 is typically associated with a year's worth of growth in a year's amount of time, a Level 4 is, therefore, associated with yielding more than a year's growth over the same amount of time. This finding may be important for school districts that desire to close achievement gaps of disadvantaged students.

Previous research by Hanushek et al. (1999) identified lack of teacher quality to be a known determinant of student achievement, while Hanushek and Rivkin (2004) found that attention to improving teacher quality was warranted to improve student outcomes. The ultimate goal of the small rural school district was to increase student achievement for all students as evidenced by value-added growth measures. It was desired that the district's strategic compensation plan, initially funded by Tennessee's Race To The Top grant, would enhance the district's effectiveness in improving

teacher quality and retaining highly effective teachers, as well as increasing the retention rates of hard-to-staff special education, high school mathematics, high school science, and high school language teachers. Since this study is the first known attempt to examine teacher compensation and teacher quality as determined by value-added growth measures explicitly additional related literature on the subject is emerging.

The results of the independent samples *t* test indicated that teachers who participated in the small rural school district's strategic compensation plan had statically significant higher TVAAS single-year individual teacher index mean results than teachers who did not participate in the district's strategic compensation plan. Therefore, a conclusion drawn from this finding is that teachers compensated through strategic compensation models, those that compensate teachers based on indicators that are linked to student performance, have significantly higher TVAAS single-year individual growth results than teachers paid by the traditional salary schedule, which compensates teachers for years' experience and advanced degrees. This finding supported similar results by Hanushek and Rivkin (2004) that showed that teachers near the top of the quality distribution obtained an entire year's worth of additional learning from their students as compared to teachers near the bottom of the quality distribution. Hanushek and Rivkin, therefore, discredit the popular argument that family background overwhelmingly trumps a school's impact on student learning, noting that high-quality teachers make up typical deficits often identified in students from disadvantaged backgrounds. Sanders and Rivers (1996) similarly found that low-performing students learned 2 to 4 times as much in a single year with the most effective teachers as compared to students exposed to the most ineffective teachers.

Podursky and Springer (2007b) stated that over time, performance pay systems tend to attract and to retain individuals who are particularly good at the activity being incentivized and repel those who are not. After 4 years of strategic compensation plan implementation, the results of this study support the findings of Podursky and Springer as over twice as many, 69%, of the district's teachers voluntarily participated in the strategic compensation plan as opposed to 31% who elected to remain on the traditional salary schedule from 2011 to 2015. Of the 42.5% of teachers in the district that were assessed by the TVAAS over the 4-year duration of this study, strategic plan participants' mean TVAAS index scores exceeded those of nonparticipants by 1.83 index points.

The Tennessee Department of Education identified highly effective teachers as those scoring a TVAAS Level 4 or Level 5 (Tennessee Department of Education, 2016b). McKinsey and Company (2010) stated that well executed strategic compensation plans have the ability to assist in the retaining of highly effective teachers. In an effort to research the claim, this study compiled highly effective teacher retention rates in the small rural school district for 4 years. While results indicated that highly effective teachers who participated in the small rural school districts strategic compensation plan were retained at a higher percentage (88.0%) as compared to 12%, results were not statistically significant, indicating that any conclusions drawn from this study would only be attributed to random chance. However, it is important to note that the small rural school district's strategic compensation plan did not have an adverse effect on the retention of highly effective teachers. Highly effective

teachers who participated in the compensation plan did not leave the district at a higher rate than those of nonparticipants.

The results of this study were consistent with those of Podgursky (2008) stating that policies that tie compensation to performance over time will pull more effective teachers into the upper tail of the teaching workforce and encourage teachers in the lower tail to leave for nonteaching jobs. This study did not hypothesize about causation, where the lower performers migrated, or if lower performers improved; however, this study can affirm that a statistically significant relationship exists in teacher quality as determined by TVAAS between teachers who voluntarily participated in the district's strategic compensation plan that included an alternative salary schedule that no longer compensates teachers based on years' experience and advanced degrees.

Recommendations for Future Studies

The quantitative design of this study suggests future qualitative designs in order to explore the attitudes, perceptions, and popularity of strategic compensation models among teachers. Such qualitative research is recommended to explore the attitudes and perceptions of strategic plan participants as compared to non-plan participants, and highly effective teachers, those identified by value-added growth measures, as compared to their lower performing counterparts. Community perceptions of such business type models that include performance monitoring and market-based incentives would be merited in determining public support for increased teacher compensation to recruit and to retain a more highly qualified pool of teacher candidates to improve student learning. Perhaps a sequel to this type of study would encourage future researchers to explore whether the increases in the teacher growth results are due to motivational effects of the incentive scheme itself or to the intentional selection of teachers over time who work well inside the structures provided within the small rural district's strategic compensation plan. It is important to conclude that further research is needed into the assumptions of this study.

With a continued commitment to excellence in mind, school districts should look holistically into designing effective strategic compensation systems over time to include multiple measures of teacher performance that includes classroom observations, student surveys, and value-added measures (Kane & Staiger, 2012). It will take time, patience, and dedication to continuous improvement to redesign present compensation systems that produce meaningful improvements in teacher quality and significant learning outcomes for all students.

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