THE RELATIONSHIP BETWEEN MERIT-PAY ON TEACHER RETENTION
AND STUDETNT ACHEIVMENT IN
A RURAL SCHOOL IN TEXAS

by

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A Scholarly Delivery Submitted in Partial Fulfillment

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Doctor of Education

Educational Leadership

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Signature Page

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ABSTRACT

The final composite explores the challenges faced by rural schools in the retention of high-quality teachers. The first scholarly deliverable is a case study article that could be used to teach masters or doctoral candidates in the field of educational leadership. The title of this article is "Teacher Incentive Allotment: Attempts at Teachers Recruitment and Retention." This case reviews a teacher's experience with the teacher incentive allotment as she attempts to earn an additional $20,000 a year and the impact it has had on her retention. The final scholarly deliverable is an empirical article titled "The Relationship Between Merit-Pay on Teacher Retention and Student Achievement in a Rural School in Texas." This empirical article explores a rural school district's first 3 years of participating in the Teacher Incentive Allotment program in Texas and its relationship to retention and student achievement.

Academic Research
Environmental Health and Safety
WEST TEXAS A&M UNIVERSITY

INSTITUTIONAL REVIEW BOARD FOR HUMAN SUBJECTS
Letter of Approval

June 30, 2023

Dr. Harper:

The West Texas A & M University Institutional Review Board is pleased to inform you that upon review, proposal **#2023.05.005** for your study titled, **"The Relationship Between Merit-Pay on Teacher Retention and Student Achievement in a Rural School in Texas"** meets the requirements of the WTAMU Standard Operating Procedure (SOP) No. 15.99.05.W1.01AR Institutional Review Board (Use of Human Subjects in Research). Approval is granted for one calendar year. This approval expires on **June 30, 2024.**

Principal investigators assume the following responsibilities:

1. **Continuing Review:** The protocol must be renewed on or before the expiration date if the research project requires more than one year for completion. A Continuing Review form along with required documents must be submitted on or before the stated deadline. Failure to do so will result in study termination and/or loss of funding.
2. **Completion Report:** At the conclusion of the research project (including data analysis and final written papers), a Close out form must be submitted to AR-EHS.
3. **Unanticipated Problems and Adverse Events:** Pursuant to SOP No. 15.99.05.W1.13AR, unanticipated problems and serious adverse events must be reported to AR-EHS.
4. **Reports of Potential Non-Compliance:** Pursuant to SOP No. 15.99.05.W1.05AR, potential non-compliance, including deviations from the protocol and violations, must be reported to the IRB office immediately.
5. **Amendments:** Changes to the protocol must be requested by submitting an Amendment form to AR-EHS for review by the IRB. The Amendment must be approved by the IRB before being implemented. Amendments do not extend time granted on the initial approval
6. **Consent Forms:** When using a consent form, only the IRB approved form is allowed.
7. **Audit:** Any proposal may be subject to audit by the IRB Administrator during the life of the study. Investigators are responsible for maintaining complete and accurate records for five years and making them available for inspection upon request.
8. **Recruitment**: All recruitment materials must be approved by the IRB. Recruitment materials distributed to potential participants must use the approved text and include

the study's IRB number, approval date, and expiration dates in the following format: WTAMU IRB##-##-## Approved: ##/##/#### Expiration Date: ##/##/####.
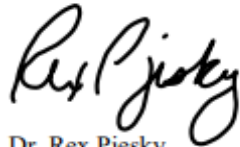
9. **FERPA and PPRA:** Investigators conducting research with students must have appropriate approvals from the Family Education Rights and Privacy Act (FERPA)

administrator at the institution where the research will be conducted in accordance with the Family Education Rights and Privacy Act (FERPA) if applicable to the research being proposed. The Protection of Pupil Rights Amendment (PPRA) protects the rights of parents in students ensuring that written parental consent is required for participation in surveys, analysis, or evaluation that ask questions falling into categories of protected information.

Sixty days prior to the expiration of this proposal, you will receive a notification of the approaching expiration date at which time you will need to submit an Amendment/Continuation/Close out form.

Thank you for your cooperation with the IRB and we wish you well with your research project.

Sincerely,

Dr. Rex Pjesky
Interim Chair, WTAMU IRB

Dr. Angela Spaulding
Vice President of Research and Compliance

Acknowledgments

Thanks first to God for everything. I am beyond blessed and thankful for the path You have put me on. I am privileged to serve my community and family in the life you have set before me.

I want to thank my family. I want to thank my children for Saturdays at home while Dad writes papers and reads. Most of all, I want to thank my wife, Eryn. You have walked alongside me for every degree I have ever earned. You have been supportive of the time sacrifice and given support to make it through. You have read every paper and provided feedback along the way. I love you and am beyond thankful to be your husband.

Thanks to my colleagues who have helped me with data and supported me through this process. I appreciate that everyone endured my constant talking about the data and what I was learning along the way. Thanks to Jerry Hollingsworth for encouraging me to go ahead and start my doctorate. Thanks to Ray Blanco for beginning the program with me and for offering support, as we both learned a lot.

Finally, I thank my professors who have shepherded me through this process. First, Dr. Harper, who was my chair, but also a support through the whole program. Your availability and individualized support is beyond anything I could have asked for. Dr. Garrison, I have learned so much from you about data and analysis, which will serve me daily. Lastly, thanks to Dr. Bigham, who was there when I started my first class in the program and was there throughout my time in the program. The support in the program was amazing, and I am beyond appreciative of the whole experience.

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Teacher Incentive Allotment: Attempts at Teacher Recruitment and Retention

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Abstract

Recruitment and retention of high-quality teachers is a growing problem facing education. Following the COVID-19 pandemic and the added stress on teachers, districts are seeing teachers flee education, and the number of education majors is decreasing. Texas has recently voted to approve a Teacher Incentive Allotment program to allow teachers to earn more money each year using the teacher evaluation system and student growth indicators. This case looks at a successful teacher who is close to retirement and her experience as she tries to earn a designation with TEA that could pay her $25,000 more a year. This ability to earn more has the potential to keep her in the classroom for an additional 5 years and thus impact student growth.

Keywords: incentive pay, evaluations, recruitment, retention

Teacher Incentive Allotment: Attempts at Teacher Recruitment and Retention

Hill Country Middle School is a small 4 A school in Texas. It is nestled into the hill country of south Texas, about 20 miles north of San Antonio. With the school so close to San Antonio and the lack of affordable housing in the county, most of the teachers are commuters to the district. San Antonio has the fourth largest school district in the state, and as a result, has a starting pay of $56,675, while Hill Country has a starting salary of $47,624. This difference of almost $10,000 makes recruitment of teachers very difficult, especially when most of them live in San Antonio. Recent legislation introduced House Bill 3, which contains a method that might be a possible solution to this problem, and it has multiple things that make it interesting.

In 2019, the 86th legislature of Texas included a teacher incentive program that is referred to as the Teacher Incentive Allotment (TIA). The goal of the program is to recognize highly effective teachers and pay them more. Teachers under this plan could make six-figure salaries if they score high enough. The rural campus designation awards are greater than those in the urban areas to help retain highly successful teachers in the rural setting, as well as help the rural setting recruit highly qualified staff. Following the COVID pandemic and the added stress on education and teachers, there is now more than ever a need to retain teachers in the classroom. There is a growing need to support their growth and recruit teachers to a campus. Rural schools are suffering far greater than those in the urban areas and need resources to help them retain and recruit high-quality teachers to see kids continue to grow.

In the 2020 school year, Hill Country Independent School District (HCISD) joined the TIA program as a district in Cohort C. HCISD has two elementary, one

middle, and one high school. The campuses each have an administrator who is new to the principalship and assistant principals who have less than 2 years of experience. There are approximately 150 teachers in the district with 2,200 students. All core teachers at the campuses were shown the program and its requirements and were then given the opportunity to apply to be a participant. Those core teachers who did not apply were also aware that even if they chose not to participate, they would have some of the same evaluation criteria as those who chose to join the program; however, they would not be eligible to receive a designation. Students' data regarding performance on three assessments would be collected for every student in core courses. Students without all three data points would be excluded from the data.

The process used by HCISD to determine if a teacher should receive a designation begins with a review of the TIA plan. In the 2020-2021 school year, it was explained to all teachers at a faculty meeting with the parameters in place. The teachers were directed to the TIA district site, which has the qualifications and criteria for the program. Teachers were given a specific date to opt into the program and its requirements. They did so by filling out a letter of intent to participate.

Those who elected to participate each quarter were given updates on any changes and processes of data collection and evaluation procedures. Each teacher agreed to have one formal observation in the fall and two formative walkthroughs. The evaluation instrument is the Texas Teacher Evaluation and Support System (T-TESS) rubric and is conducted by a trained T-TESS administrator. At the end of the school year, teachers conducted a summative evaluation with the administration to evaluate the Domain 4

components of the TTESS rubric. The cumulative scores were collected in a 1-5 for each domain.

- 1 = Needs
- 2 = Developing
- 3 = Proficient
- 4 = Accomplished
- 5 = Distinguished

Teachers who elected to participate knew about the expectation to go above and beyond and to earn more money. Teachers can earn one of three designations, recognized, distinguished or master. The bonus for recognized is $3,000-$5,000, distinguished is from $5,000-$12,000, and master teachers can earn from $12,000-$25,000 more per year.

One of the teachers who participated in the program was Dee Dee Smith. She is a 7th grade science teacher who has been in education for many years. Mrs. Smith is nearing the end of her career and can retire at the end of the 2022 school year. She is the type of teacher who most would consider a master teacher. She is a highly dedicated teacher in everything that she does and commits wholly to the things that she does. When the opportunity for the TIA program was introduced to her, it intrigued her. Schools in the TIA program can choose whether the additional salary counts toward their retirement or not. Hill Country ISD decided that any incentive pay received by a teacher would contribute to the teacher's retirement averages. In the Texas retirement system, a teacher can retire when they reach a magic number that includes years of service and age. These magic numbers are referred to as the Rule of 80 and Rule of 90. For each of these rule criteria, when a teacher retires, they receive a percentage of their top five salaries from

their years of service. Since Mrs. Smith is at the end of her career, she has the ability to not only earn $25,000 more a year but also to add to her retirement for the rest of her life. If she reaches a designation, the school looks to retain a highly qualified teacher who is successful for what could be 5 years of service.

Mrs. Smith followed the process and applied to be a participant in the TIA program. She sent in her letter of intent based on the criteria established by the review committee and centered around the core values of the district.

Dear Review Committee:

Given any situation, a teacher has that innate ability to consistently organize, explain, affirm, motivate, and lead. Since my childhood, this intrinsic drive has held steadfast. Truth be told, I will teach with 100% of my best effort to the end of my career, but it is exciting to know that there could be a monetary blessing as well. This letter is being submitted with the intent to apply for the HCISD TIA program.

Integrity:

While I love teaching the specifics of my subject and motivating my students to reach for medical careers, my true calling extends well past those borders. I embrace guiding my students to be the best possible version of themselves. I want them to understand how they learn, how to study, and how to succeed beyond my classroom. I view my job as a ministry. Students need to learn to be honorable, do the right thing no matter what, and care about others. The best way to do this is to model and live in truth before them. I begin each school day in prayer for my

students. It is my responsibility to be professional in appearance, character, attendance, speech, and demeanor. The impact of a sincere smile and an attitude of positivity assure my students that they can trust and depend on me.

Pride:

Hands down, I take pleasure in celebrating the accomplishments of my students. I enjoy sharing in their sense of pride for an achievement reached or a goal surpassed. I love cheering for them at games, supporting their role in a performance, acknowledging UIL victories, posting unique classwork, displaying projects, affirming them with notes of encouragement, and jumping at the chance to write letters of recommendation for scholarship, or college admission. Year after year, former students write or return to show their gratitude for how those simple actions made a difference in their lives.

Choices:

Leadership, direction, goal setting, decisiveness, and seeing things in black and white have always been my strengths. I usually do not deviate from the set plan. The idea of allowing choice is not a new concept for me, but it is the one area that I feel I am stretching and growing in the most. Students certainly need to be trained to make wise decisions in behavior and actions, but there is such value in allowing them to make choices in their education. I watch as my students enthusiastically select from options

and marvel at the focus it gives them to be in control. I see them grow in confidence and am encouraged to continue providing options in learning.

Small-Town:

Our passion for country living led our family to move to Hill Country 18 years ago. We embraced our rural community through training horses and raising livestock through FFA and 4-H, worshiping in a small church, and actively serving alongside our like-minded community. We know it was the right move and we have been blessed with the added bonus of a school system that truly joins in raising our youth. I am part of a team that supports, encourages, and serves one another. We value these connections and shared responsibilities. My role in our community extends beyond the classroom. I have personally helped organize in-service components and creatively assisted in our district convocation, including "The Git Up" dance and "Survivor Challenge". I served as the student council sponsor and coached both the FFA Vet Med and judging teams. In addition, my husband and I teamed together to pioneer "Young Life for Hill Country County". It was a great honor to serve as a member of the HCISD Vision Team. Countless hours were spent fine-tuning our Vision Statement and Core Values. It is now my responsibility to educate our students, parents, and community on the relevance of these foundational cornerstones. I am especially excited about several endeavors my GTISM students will be embarking on this year. They will be designing projects that reinforce the HCISD Vision Statement and Core Values. I see this as a way to

perpetuate our district vision not only to our community, but also to the next generation of Hill Country graduates and future residents. It is with a truly humble heart that I submit this letter. Thank you for your consideration.

Respectfully Yours,

Dee Dee Smith

At the beginning of the year, Mrs. Smith was highly engaged in the process. She intensively listened to the informational meetings conducted during the first month of school. Since she was not in a State of Texas Assessments of Academic Readiness (STAAR) tested area, she had to create her beginning, middle, and end of year assessments. These assessments were put into a digital program that would calculate scores and allow for easier data reflection. During the first few weeks of school, every student in her 7th grade science class took the beginning of the year test. The data were collected and put into the spreadsheet for her data analysis. She reviewed the data and looked for how she could improve student performance and help them grow in their knowledge of science. She took her plan and put it into action, planning how she would intervene and making lessons that engaged her students. All evaluations for teachers were to be conducted by the end of December. Before that time, Mrs. Smith met with her evaluator to make sure she would be ready for the day her evaluation came. Together they walked through each of the domains and discussed how she could implement her lesson to make sure her scores met the accomplished and distinguished dimensions. One of the examples from the meeting was the need to have student leadership in the

classroom and let them take control of different aspects. She knew this was a weakness of hers and began to investigate ways to make it better for students.

The day of her evaluation came, and she had successfully implemented all her strategies. The students in the classroom had established roles for each person in the groups. Mrs. Smith seamlessly integrated the group structure into the classroom as they learned about the digestive system. There were group interactions with students who managed supplies and the performance of each group member. Together they simulated a digestive tract with hands-on devices and explained the process to her and each other. The class laughed, learned, and was engaged in a lesson they would not soon forget. When she met with her principal, he reviewed that she had received an overall rating of 4.5.

She had received the highest rating of her career and outperformed most of the teachers on her campus as well. Not only did she get an exemplary evaluation score, but her student growth data was also high. Her student growth score was 4.5, which was the highest it could have been. Based on the data, the school would be making a recommendation to TEA the designation of a master teacher.

During the 2021-2022 school year, the data were collected for the district, compiled into documents for TEA, and submitted in November of 2021 to TEA for approval. In February of 2022, the district was notified of the approval of teacher designations. Mrs. Smith, in the 2022-2023 school year, will be adding to her certificate the designation of "master teacher." She will receive an additional $25,000 at the beginning of the year as a lump sum and will continue to receive the additional money each year until she renews her certificate or receives a new designation.

Teaching Notes

The thing that affects student performance the most is the teacher. Knowing this information makes teacher retention and recruitment an important thing to focus on, especially since it is a growing problem in education. It may seem like a very logical thing that pay is connected to performance. For years, the business world has had the bonus and pay structures to motivate its workers to better performance. This premise is why we must investigate if incentive pay will change the education industry.

Teacher Pay

Teacher pay is most commonly is an input model of compensation that produces a salary or pay scale for teachers to follow (Porwoll, 1979). Podgursky and Springer (2007) indicated that based on a national survey, 100% of teachers in a traditional public-school setting are paid based on a salary pay scale. This of course, means that teachers are paid based on years of service and not based on any level of job performance. Each teacher, regardless of student growth, professionalism, training, or degrees, is paid the same. Critics of this type of compensation method argue that the method of payment does not align with the overarching purpose or goals of the public school (Heyburn et al., 2010). The argument is made that a payment system that uses some sort of measurement that connects to teachers' and students' output will better reward the efforts of teachers (Tompkins, 2017). As a result of this perspective, there is a growing trend of schools using some sort of merit-based pay or bonuses. There are efforts to approach teaching in the same manner that the business world approaches its employees. Monetary incentives are seen as an effective method to recruit and retain high-quality teachers as well as to motivate others to join the profession (Springer& Winters, 2009). Legislators continue to

push for bonuses and merit pay tied to educator performance in an effort to see student achievement increase (Burns & Gardner, 2010).

Attempts at Merit Pay

There are different approaches to incentive pay for teachers, and some methods have come and gone over the years. Most of them focus on student performance and the ability to maintain a monetary program (Neal, 2008). Many attempts for merit pay receive resistance from teacher unions (Rice et al., 2012). One state that has navigated these hurdles and attempted merit pay is Michigan. In 2010, Michigan enacted Public Act 205, which made changes to the school code section 1250 (Tompkins, 2017). This plan required that schools in Michigan alter and change their compensation plans to include teacher performance. In 2011, the state made more changes to include personnel decisions. This provision requires decisions for personnel to be based on performance and not based on tenure (Tompkins, 2017). Michigan also delegated the authority of superintendents and school boards to determine how to respond to these changes (Canfield-Davis & Jain, 2010). According to Tompkins (2017), most schools ignored this approach and made no changes to their system, 18% provided small bonuses based on evaluations, and 8% actually moved away from the teacher-step pay system altogether. Most avoided the changes to avoid conflict, even if they believed in the importance of accountability (Tompkins, 2017).

Another state that made changes to its payment system can be seen in Denver schools. In 1999, Denver Public Schools agreed on an alternative teacher pay system that links teacher pay to the performance of students and adopted the Professional Compensation Systems for Teachers in 2004 (Podgursky & Springer, 2007). This system

had a focus on knowledge and skill but added supplements for student growth to the pay system. Podgursky and Springer (2007) explained how the initial pilot system grew to be one of the most well-known performance pay programs.

The TIA program in Texas was not the state's first attempt at incentive pay systems. In 2006, Governor Rick Perry signed into legislation the Governor's Educator Excellence Award Program, which added three grants that could be offered to schools (Podgursky & Springer, 2007). Many schools took advantage of the grants to provide additional compensation to teachers. The program awarded millions of dollars and was in place from 2006-2009. Florida, Minnesota, California, and others have all made attempts at incentive pay programs. Despite these attempts, the success and sustainability of programs are all over the map.

Teacher Growth

Each year, administrators and teachers embark on the year-long journey of growth and development. They do so to make sure students are growing and developing, but they also seek to improve the teachers' practice as well. In most cases, the method for this improvement is the teacher evaluation system. Evaluations of principals, as well as teachers, are one system that should connect professional development and growth to teacher and leader weaknesses (Milanowski et al., 2007). There are two purposes of teacher evaluations. The first is to enhance student learning, and the second is to enhance teacher practices through guiding professional development (Isore, 2009). McFadden and Williams (2020) explained that evaluation and evaluation capacity building is not prevalent in research, even though it has clearly been identified in an expectation for teachers. There is strong evidence that teacher evaluations are irregularly conducted and

fail to provide guidance to teachers or administrators (Weisberg et al., 2009). Duffett et al. (2008) explained that teachers, however, feel the evaluation is not useful to them in improving their practice. As a result of this reality of evaluation systems, many schools, and states have looked at incentive pay as a method for driving growth and performance by rewarding those who are highly successful.

Conclusion

Looking for ways to improve schools is always going to be at the forefront of education. Finding ways for teachers to grow and develop is one of the most impactful things that can be done for student achievement. Money is always a motivator for people, and schools have tried incentive programs to motivate teachers for years. Various models have been tried repeatedly across the country in this effort, and Texas is again looking into a teacher pay program. Maybe TIA will be the program that grows teachers, pays those more and, as a result, grows students too. It is clear in this instance, that there will be teachers motivated by the extra pay, and this motivation may just keep them in the classroom and on their campus longer. More investigation will be needed to determine if actual student growth occurs, if teachers sustain changes implemented to qualify, and if, together, these things reduce attrition and recruit staff to the rural setting.

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Discussion Questions

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1. What implications does this case offer for schools and districts that are struggling to recruit and retain teachers?

2. What are the staff issues facing you? Prioritize them. Which ones would you address first? Which ones would you NOT address, at least for now? Are the staff issues the most pressing issues overall? Explain the reasons for your answers, as

well as the process you use to reach your conclusions. Would teacher pay change any of these issues?

3. Mrs. Smith indicates that schools that have high-quality teachers close to the end of their careers are motivated by incentive pay. What key takeaways should a principal and superintendent consider when implementing a teacher incentive pay program?

4. Discuss if a teacher incentive pay program would create growth in teachers and students. Do high-performing teachers continue to perform while low-performing teachers struggle?

5. Does the addition of incentive pay make teacher evaluation systems more worthwhile for teachers and create growth?

6. Discuss the impact of incentive pay and its effect on lasting change. Do teachers return to previous practices after a designation is earned, or is the change sustained?

7. The incentive pay program takes roughly 3 years for the first pay out of cash. What are the implications to recruitment and retention if it takes 3 years to see any benefits of the program?

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The Relationship Between Merit-Pay on Teacher Retention and Student

Achievement in a Rural School in Texas

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Abstract

Purpose: The problem this study addressed was that teachers are not staying in the profession, and this is having a dramatic effect on student achievement. **Research Method:** A quantitative study of a school district utilizing the Teacher Incentive Allotment in Texas and its relationship to retention and student growth. **Findings:** The findings do not support a strong relationship between merit pay and teacher retention. The findings do support a relationship between participation in merit pay and student achievement. **Conclusion:** The limited amount of teacher turnover makes it difficult to identify a relationship to retention, but there was a relationship to participation and student achievement.

     Keywords: Merit-pay, incentive pay, student achievement, retention,

The Relationship Between Merit-Pay on Teacher Retention and Student

Achievement in a Rural School in Texas

Teachers are one of the most valuable resources a school has, and as research indicates, teacher quality is one of the best predictors of student success and school outcomes (Chetty et al., 2011; Ingersoll & Merrill, 2017). The loss of quality teachers is a direct threat and is becoming the next crisis that school leaders will be tackling (Perna, 2022). The 2021 State of the U.S. Teacher Survey found that "one in four teachers said that they were likely to leave their jobs by the end of the 2020–2021 school year, compared with one in six teachers who were likely to leave, on average, prior to the pandemic" (Steiner & Woo, 2021, para. 4). The condition in Texas is dismal as well. Rajwani-Dharsi (2022) reported:

> At the start of the last school year, almost 43,000 teachers in Texas did not return
> to the school district where they worked the previous year. The 11.6% attrition
> rate was the highest the state has seen in over a decade, and it will likely increase,
> per the Texas State Teachers Association. (p. 2)

Each year, schools seek to increase student achievement; however, this is increasingly difficult to achieve when schools cannot retain quality teachers.

There are several reasons why quality teachers are leaving the profession. One of the reasons is poor salaries. The average salary for a teacher in 2021 was $65,090, which is about $10,000 less than the average pay of year-round workers (USAFacts, 2022). The U.S. Census Bureau compared the average salary of teachers and year-round workers from 2010 to 2021, and the results show that there is an overall decrease in teacher pay when adjusted for inflation, while with other jobs, the salary continued to increase

(USAFacts, 2022). In Texas, public school teachers' salaries are more than $7,500 below the national average for educators, and they are making 1.5% less than Texas teachers were making in 2013 (Leahy, 2022).

Problem and Purpose

The problem this study addressed was that teachers are not staying in the profession, and this is having a dramatic effect on student achievement. This is a particular concern for rural schools because of the challenge of recruitment and retention. McHenry-Sorber and Campbell (2019) reported that rural school teachers are "more likely to leave the profession entirely," which leads to the hiring of teachers with "substandard credentials." (p. 5). This study focused on the need to retain rural school teachers through salary increases using merit-pay. Merit-based pay or teacher incentive pay is often sought as a method for closing the pay gap and retaining teachers (Pham et al., 2021). Merit-pay has also been linked to higher student test scores (Jacobson, 2020). The belief is that when teachers are retained at a campus, there is also an increase in student achievement. This study sought to answer the following questions and test the associated hypotheses:

> **RQ1.** Is there a significant relationship between teachers in the test district who received a merit-pay designation and teachers who did not receive a merit-pay designation and the retention of those teachers in a school district?
>
> > **H1a**: Teachers who received any level merit-pay designation will be retained at higher rates than teachers who did not participate in the merit-pay designation program, during the time period examined.

H1b: Teachers who received any level of merit-pay designation will be retained at higher rates than teachers who participated in the merit-pay designation program, but did not receive any merit-pay designation, during the time period examined.

H1c: Teachers who received a high merit-pay designation will be retained at higher rates than teachers who received a low merit-pay designation during the time period examined.

RQ2. Is there a significant relationship in student achievement between teachers in the test district who participated in the merit-based pay system, and those who chose not to participate in a merit-pay designation in a school district?

H2. Teachers who participated in the merit-pay designation program (irrespective of designation) will have higher student growth scores than teachers who did not participate in the merit-pay designation program.

Theoretical Framework

There are three theoretical frameworks that guided this study. The first of those is the Hawthorn Effect, commonly known as the observer effect (Elston, 2021). The theory suggests that there is an observable difference when observers are being watched (Elston, 2021). The theory originated in an electrical works in Chicago, and they noticed a change in productivity related to being aware of being observed. Similarly, the teacher evaluation system is not often connected to any sort of teacher incentive pay. Those evaluation scores or teacher performance scores are tracked and logged, as well as the tracking and logging of student performance. This then has the potential to be a motivator of change and behavior.

In addition to the Hawthorne Effect, Maslow's hierarchy of needs was used. Maslow in 1943, established five stages of needs that people are motivated. The five needs drive decision making for people. (McLeod, 2018). Those five needs are psychological, safety, belonging and love, esteem, and self-actualization. These needs are important as they speak to intrinsic motivations as well as extrinsic motivations. Merit-pay systems have an obvious extrinsic motivation, that of more pay. In addition to the pay, there is a level of recognition and accomplishment that goes with the award, which can speak to the needs of esteem. Amabile et al. (2014) determined that employees are positively motivated by their supervisor's recognition if that recognition is genuine and connected to actual progress.

Vrooms Expectancy Theory is an additional framework in the study. This theory explains that people are motivated by meeting expectations (Rice & Malen, 2017). Teachers who know the expectations of what it will take to meet incentive pay metrics, will work hard to achieve these goals. Since these expectations are teacher performance and student achievement, teachers will achieve more growth in themselves as well as their students.

Review of Literature

This literature review begins by reviewing factors that affect teacher retention and what teacher motivations are. After establishing these factors, the literature review discusses teacher pay and the use of teacher pay scales. Due to the lack of connection to student growth or teacher performance, the literature review explores the various aspects of merit-pay. Merit-pay in schools is not a new concept and has been tried other times.

This study investigated other attempts at merit-pay, merit-pay and teacher evaluations, merit-pay and student achievement, and lastly, the barriers and benefits of merit-pay.

Factors of Teacher Retention

Borman and Dowling (2008) conducted a meta-analysis of the contributing factors to teacher turnover and identified four themes. They stated that attrition is not necessarily a bad thing; attrition often has to do with personal and professional factors throughout a career, work conditions are much more important than previously thought, and support, collaboration, and salaries are contributors to retention and are agreeable to change. Nguyen et al. (2020) updated this framework and combined factors into three categories. The categories are personal, external or policy, and school factors. Personal factors include things like age, gender, number of children, and career satisfaction. Personal factors also would include education, years of experience, and specialty. School factors included the location of the school, learning communities, class size, student achievement, student demographics, and level of poverty. External policy factors are things such as evaluation policies, teacher and principal effectiveness, merit-pay, and salary (Nguyen et al., 2020). Many of these factors are not limited to education. In his investigation of technology employees and their retention, Döckel et al. (2006) identified six characteristics of retention. Compensation, job characteristics, training and development, supervisory support, career opportunities, and work-life balance are the factors they identified. With that in mind, schools have little impact on the personal factors identified and little control over school factors.

Teacher preparation is a major factor in the motivation and success of a teacher, and its impact is often overlooked (Darling-Hammond, 2014). New service teachers

reported a "disconnect" between the training and the real-world teaching in a classroom. These teachers felt that they were lacking in the skills to manage a classroom, problem-solving, and did not know how to collaborate well with coworkers (Kaufman & Al-Bataineh, 2011). Alternative teaching programs lack training and support even more than traditional teacher coursework, and as a result, there is a steep learning curve for them. Alternative teacher candidates had a 50% attrition rate after 3 years (Boyd et al., 2011).

Another area that is a motivator for teachers is their working conditions. The physical workplace is defined as the political, psychological, educational, and organizational structures of the workplace (Ladd, 2011). Principal support, coworkers' interactions, and the ability to participate in decision-making are key workplace conditions that are vital in decisions to stay in the workplace or in education at all (Podolsky et al., 2017). Campuses with a high number of students with disruptive behavior also have a negative influence on teacher motivation and are the leading cause of stress in the workplace (Agezo, 2010). Agezo explained that this disruptive behavior of students has a direct effect on teachers' excitement, love, and passion for their careers. This then leads teachers to want to pursue jobs in other fields.

Teacher Motivations

The teaching profession is demanding, emotionally exhausting, and sometimes frustrating (Lambert et al., 2017). With that in mind, it is easy to see that it requires commitment and motivation to become a teacher. Student motivation is directly affected by teacher motivation, and as a result is of concern (Neves de Jesus & Lens, 2005). Sinclair (2008) surveyed preservice teachers and identified 10 motivators. They are the desire to work with students, to make a difference, because it is a calling, love of a

subject, to influence others, imparting knowledge, convenience of teaching, career security and salary; it is an easy job, and social status. Once in the profession, the motivations for teaching change because of experiences and doing the job (Sinclair, 2008). Others have identified that there are both intrinsic and extrinsic motivators to enter the profession. About 15% of teachers leave their school for another school because of better salaries and benefits (Marvel & Lumpkin, 2007). In relation to Maslow's theory of needs, teachers in these studies appeared to be making decisions to generate more revenue and to satisfy the needs of recognition.

Teacher Salary (or Compensation)

Cocoran et al. (2004) found a connection between teacher pay and teacher quality. Many teachers feel that their salary does not adequately represent the time and effort put into their job (Kaufman & Al-Bataineh, 2011). Darling-Hammond (2010) discussed a decline in the salary of teachers since the 90s, and that they may earn less than others with a college degree. Teacher salary is most commonly is an input model of compensating that produces a salary or pay scale for teachers to follow (Porwoll, 1979). Podgursky and Springer (2007) indicated that based on a national survey, 100% of teachers in a traditional public-school setting are paid based on a salary pay scale. This of course, means that teachers are paid based on years of service and not based on any level of job performance. Each teacher, regardless of student growth, professionalism, training, or degrees is paid the same. Critics of this type of compensation method argued that the method of payment does not align with the overarching purpose of goals of the public school (Heyburn et al., 2010). The argument is that a pay system that uses some sort of measurement that connects to teachers' and students' output will better reward the efforts

of teachers (Tompkins, 2017). As a result of this perspective, there is a growing trend of schools using some sort of merit-based pay or bonuses.

There are efforts to approach teaching in the same manner that the business world approaches its employees, such as performance-based bonuses. Monetary incentives are seen as an effective method to recruit and retain high quality teachers as well as to motivate others to join the profession (Springer et al., 2009). Different states often offer incentives that are short-term benefits to teachers in a state or a district. For example, New York offered a housing stipend for 2 years as well as a $5,000 dollar signing bonus for new teachers' years (Spradlin & Prendergast, 2006). These types of monetary benefits are great at recruiting teachers initially, but not enough data exists to determine the longevity of retaining teachers (Spradlin & Prendergast, 2006). Legislators continue to push for bonuses and merit-pay tied to educator performance to see student achievement increase (Burns & Gardner, 2010). Initial salary and benefits are most beneficial to those who are new to the industry, and other factors, such as school support and working conditions, are better influencers of experienced teachers (Podolsky et al., 2017).

Merit-Pay

When the U.S. Department of Education (2010) initiated the reauthorization of the Elementary and Secondary Education Act, one of the solutions offered to ensure highly qualified teachers in classrooms was the use of merit-based pay. They indicated that student performance is connected to the determination of the award. As a result, various methods have emerged regarding merit-pay.

The first of those is a group-based merit-pay system. This is usually a campus or district-based program that awards based on campus performance. Over 12% of teachers

have received some sort of merit-based pay in this type of system (Brehm et al., 2015).

Brehm et al. reported a decrease in teacher effectiveness in group-based pay systems.

Fryer (2011) researched group-based systems and concluded that the pay was often not

large enough due to the method of distribution, and that this often created a system where

teachers benefited from the work of others. This is the suggested reason for the system's

failure. Growth and change did not occur, instead teachers coasted on the hard work of

their colleagues (Fryer, 2011).

Individual merit-pay plans are another method that has been tried. Research

indicated it might have a positive impact and be beneficial (Brehm et al., 2015). This type

of system prevents benefiting directly from other teachers' performance and requires

each teacher to generate their own growth and increase student achievement. The size of

the merit-pay can often be larger in individual pay plans, and this can create more

motivation if the reward is large enough (Imberman & Lovenheim, 2013). Springer et al.

(2012) found that individual incentive methods produced a greater performance from

teachers and students than those in a group-based system.

Merit-Pay Attempts. There are different approaches to merit-based pay for

teachers, and some methods have come and gone over the years. Most of them focus on

student performance, and the ability to maintain a monetary program (Neal, 2008). Many

attempts for merit-pay receive resistance from teacher unions (Rice et al., 2012). One

state that has navigated these hurdles and attempted merit-pay is Michigan. In 2010,

Michigan enacted Public Act 205, which made changes to the school code section 1250

(Tompkins, 2017). This plan required that schools in Michigan alter and change their

compensation plans to include teacher performance. In 2011, the state made more

changes to include personnel decisions. This provision requires decisions for personnel to be based on performance and not based on tenure (Tompkins, 2017). Michigan also delegated the authority of superintendents and school boards to determine how to respond to these changes (Canfield-Davis & Jain, 2010). According to Tompkins (2017), most schools ignored this approach and made no changes to their system, 18% provided small bonuses based on evaluations, and 8% moved away from the teacher step pay system altogether. Most avoided the changes to avoid conflict, even if they believed in the importance of accountability (Tompkins, 2017).

Another state that made changes to its pay system was the Denver Public Schools. In 1999, Denver Public Schools agreed on an alternative teacher pay system that linked teacher pay to the performance of students and adopted the Professional Compensation Systems for Teachers (Podgursky & Springer, 2007). This system had a focus on knowledge and skill but added supplements for student growth to the pay system. Podgursky and Springer (2007) explained how the initial pilot system has grown to be one of the most well known performance pay programs.

The Teacher Incentive Allotment program in Texas was an attempt at incentive pay systems. In 2006, Governor Rick Perry signed into legislation the Governor's Educator Excellence Award Program, which added three grants that could be offered to schools (Podgursky & Springer, 2007). Many schools took advantage of the grants to provide additional compensation to teachers. The program awarded millions of dollars and was in place from 2006-2009.

Merit-Pay and Teacher Evaluations. Teacher evaluations are a way to justify and implement merit-pay. Each year administrators and teachers embark on the year-long

journey of growth and development. They do so to make sure students are growing and

developing, but they also seek to improve the teachers' practice as well. In most cases,

the method for this improvement is the teacher evaluation system (Stronge & Tucker,

2020). The most common teacher evaluation method is a single observation or a

combination of short walkthroughs and formal observations (Harris et al., 2014). There

are two purposes of teacher evaluations. The first is to enhance student learning, and the

second is to enhance teacher practices through guiding professional development (Isore,

2009). These observations are important because the teachers' ability to increase student

performance is based on the little information provided in observations (Kane et al.,

2011).

Researchers have given feedback on what is needed to have an effective

evaluation system (Harris et al., 2014). One of the arguments is that an evaluation system

should be based on more than one component. According to Tyler (2010), if an

evaluation system included student feedback, observations, and performance data, it

would be a fairer and more reliable system. Another criticism of teacher evaluation is the

lack of attention to personal growth. Evaluation systems for teachers should connect

professional development and growth to teachers' weaknesses (Kimball & Milanowski,

2009).

There is strong evidence that teacher evaluations are irregularly conducted and

fail to provide guidance to teachers or administrators (Weisberg et al., 2009). Duffett et

al. (2008) explained that teachers, however, feel the evaluation is not useful to them in

improving their practice. As a result of this reality of evaluation systems, many schools

and states have looked at incentive pay as a method for driving growth and performance

by rewarding those who are highly successful. The connection between observing teacher practices and incentive pay follows the framework of this study: the Hawthorne effect, Maslow's hierarchy of needs, and Vrooms' expectancy theory. These theories connect the need to observe teachers and reward them for high performance.

Merit-Pay and Student Achievement. In many industries, the method to determine bonuses or raises is based on an evaluation. In addition to a teacher evaluation, student achievement is the next model for measuring the worth of an educator to determine if they deserve incentive pay or other things that may help retain them in the profession. Research on the effects of merit-pay on student achievement can help shed light on whether the additional pay affects retention as well.

Fryer (2011) conducted a study in New York regarding incentive pay and student achievement. The study indicated that there was no statistically relevant change in the performance of students. However, Fryer felt that it might be beneficial in other locations with a few minor changes. Springer et al. (2012) also evaluated a group-based incentive program and found that it did not have a positive effect on student achievement. An international study of merit-pay identified 27 countries that participated in a system and concluded that there was a slight difference in the standard deviation in math performance than those countries that did not have a program (Buck & Greene, 2011). In contrast, Barnett and Ritter (2008) found that merit-pay lead to higher performance in their evaluation, and so did Imberman and Lovenheim (2013) in a group incentive study.

There are indications of possible negative consequences of merit-pay on student achievement as well. One such study was conducted in New York at lower socioeconomic schools where they implemented a group-based incentive program. They

found that there were teachers who benefitted from the hard work of their peers rather than working harder for the incentive (Goodman & Turner, 2013). It is clear research in this area exists on both sides of the issue. This indicates that there needs to be more investigation into this. McFadden and Williams (2020) explained that evaluation and evaluation capacity building is not prevalent in research even though it has clearly been identified as an expectation for teachers. With a gap in research regarding evaluations and capacity building, there is a limited amount of information on how it affects merit-pay.

Barriers to Merit-Pay. As previously discussed, there are multiple variations of merit-pay that exist, which creates an array of barriers to the success of such programs. Some merit-pay programs are group-based incentives where the school performance of grade level performance is used to determine the award (Brehm et al., 2015). Fryer (2011) looked at the New York incentive program and suggested that because the money was divided up among others, the overall payout may not be big enough to create motivation. The pay gap between teachers and other fields makes it difficult to retain educators. Allegretto and Mishel (2016) discussed that the gap between experienced teachers and entry-level educators is a big one. The inconsistency of teacher evaluation methods has, over time reduced the value of many evaluations for teachers.

Donaldson (2009) explained that teacher evaluations, often ending with almost every teacher scoring satisfactory, indicated that evaluation systems are ineffective. As a result, when merit-pay is connected to evaluations there could be a level of mistrust when connected to pay. The payment systems for merit-pay vary. Some systems pay a one-time payment, while others have an actual salary increase. One-time payments are more frequent, as they do create an increase in the salary budget and must be re-earned each

year (Park & Sturman, 2012). Those that change the salary schedule create a yearly expenditure in the new budget. Payments based solely on scores have some popularity. Businesses base their pay and decisions on actual revenue, while schools have a budget that gets smaller every year while expectations increase (Ramirez, 2011). Federal and state funds are often available, but there is never a guarantee that those funds will remain.

Berk (2005) encouraged the use of multiple data points to measure teacher effectiveness better. A single test on a single day is not a good measure of the success of a teacher. Some of the research focused on teacher perceptions of merit-pay systems. Gius (2015) stated that school districts with teachers in a merit-pay system are less excited about teaching and are likely to leave for better pay. One instance that emerged around pay and bonus pay for teachers was the Atlanta cheating scandal. School officials made the news for cheating on state tests, writing false statements, and various other charges. They were motivated to cheat because of a fear of money. Those who met 70% of their targets were given bonuses of $50.00 to $2,000.00 (Georgia Public Policy Foundation, 2015). This has been used as an argument against merit-pay processes.

Benefits of Merit-Pay. The common thought about merit or incentive pay is that it will increase teacher retention and recruit more teachers into the profession. New teachers to the profession on a step-pay scale start out with reasonable pay. However, as years progressed, the growth of the pay scale for teachers had little growth, and with inflation and the cost of healthcare, there was often an overall decrease in the amount of actual money a teacher took home. Most educators explained that they were not in the profession for money; however, it was often the reason teachers left, as well as the reason others did not enter the profession (Weldon, 2011).

The evidence is clear that paying teachers more supports retaining teachers. In a Texas study, Hendricks (2014) looked at teacher pay and presented a few major results of his work. Looking at the teacher pay in relation to turnover, he concluded that an increase in the teacher base pay would reduce the amount of teacher turnover (Hendricks, 2014). The other most compelling result is that an increase in teacher pay caused an increase in student performance. This increase was caused by the average experience of a teacher also increasing (Hendricks, 2014).

Teacher evaluations are an approach to increase student achievement and can be connected to merit-pay systems. Kane et al. (2011) indicated a well-executed observation system with a set standard increases student achievement. Merit-pay systems often affect the quality of the evaluation system. Consistent criteria on how teachers are measured, set by their administration and others, can result in better training, and increase confidence and validity in evaluations (Tyler, 2010). The process can help develop better teachers and increase retention among new and experienced teachers alike. These types of evaluation methods include feedback and professional development make them a positive attribute of a merit-based pay system.

In many industries, not just education, there is a belief that if more is paid to someone, they will remain at that company or in a field. The growing shortage of teachers in the nation makes this a possible benefit to education (Aragon, 2016). Teacher pay is so low that in some places, it is not enough to afford the middle-class lifestyle (Kopkowski, 2008). The single pay-step pay system that exists in education creates a stagnant pay scale that does not rise with inflation (Weldon, 2011). Merit-based pay gives teachers the opportunity to change this for themselves. The teacher pay system, as it

currently exists, does not reward extra work. Teachers who invest more time before and after school are not paid for the extra work that they do. This means there is no incentive for a teacher to go above and beyond. Weldon (2011) stated that money is not the main reason for teachers to enter or stay in education. Regardless of that statement, money is a motivation and teachers should be compensated for the extra effort (Hendricks, 2014). It is believed that merit-pay or the prospect of making more money may also increase the number of students entering education as a major and retaining teachers in education (Gius, 2015).

Method

Research Design

This quantitative study used 3 years of merit-pay data from a rural school district in Texas to determine if there is a relationship between merit-pay and teacher retention, and if a teacher with a designation of teacher growth has more growth. To determine the relationship, a pattern analysis utilizing Observation Oriented Modeling (OOM) will be used. This analysis is compared to the traditional method of using a chi-square test of independence. The expected values of teachers not retained was expected to be low, which will violate the assumptions of a chi-square. The low OOM also overcomes problems and the limitations of null hypothesis significance testing (Grice et al., 2017). Observation Oriented Modeling creates a matrix of data that makes a visual pattern for determining predicted patterns. This study attempted to identify if there was a cause and effect relationship between the merit-pay and the various hypotheses. Using the matrix created in OOM, the correct causal relationship was observed prior to any statistical analysis of the data, allowing for a better-identified model used for testing (Grice, 2014). Once the model was identified, the test provided a c-value or chance value, derived from

the rerandomization test. The c-value is recognized by quantitative experts as superior to the traditional p value (Manly, 2006).

House Bill 3 of the 86th Legislature in 2019 established the Teacher Incentive Allotment as a new merit-based pay program in Texas. This study's merit-pay program utilized the teacher evaluation from the Texas Teacher Evaluation and Support System or T-TESS and a student growth measure to award a designation. All teachers, irrespective of their participation in the program, had the same data collected.

The T-TESS evaluation system of Texas has four domains, and each domain has dimensions that can score from 1-5. These four domains are averaged to determine the overall T-TESS score. Teachers' individual student growth is calculated for each teacher based on the number of students in their classes that grew. The test district's criteria for growth was established in their Teacher Incentive Allotment plan. The plan created three categories of teacher growth scores:

- Growth between 0-55% is awarded a score of 3.7
- Growth between 56% and 60 % is awarded a score of 3.9
- Growth between 61% and 100is awarded a score of 4.5

The growth score and the T-TESS score are averaged together to determine the overall merit-pay rating. Based on the overall score teachers can receive one of three designations. The three designation levels are:

- Recognized designation: an overall average rating of 3.5-3.7.
- Exemplary designation: an overall average rating of 3.8-3.9
- Masters designation: an overall average rating of 3.9-4.5

In addition to the evaluation and the student growth measure, the district exit interview documentation was reviewed. This is a district survey that all employees who do not return to the district fill out before their last day of employment and turn in to their supervisor. The survey asks the respondents the following three questions regarding leaving the district. Questions One and Two allow for the respondent to check one of the 10 reasons for leaving the district.

1. What is the main reason for leaving?

2. What are other reasons for leaving?

3. Did you leave to go work in another district?

The study used the teacher designation data and survey data to analyze the effects on teacher retention. Additionally, the study used teacher designation data and student performance data to analyze the impact on student growth.

Data Collection

The data collected were from a rural school in Texas, with two elementary, one middle, and one high school. There are approximately 150 teachers in the district with 2200 students. Data were collected for all teachers within the district, irrespective of their participation in the merit-pay initiative. Student performance data were used to determine teacher growth will also be collected. Exit surveys from the past 10 years were collected for any of the teachers who left the district. The research was conducted by one of the administrators of the district.

Data Collection Procedures

The study's school district agreed to allow the use of the teacher TTESS data, student performance data, and teacher designation status data. The teacher de-identified

TTESS data were collected form the district online database where the teacher evaluations are stored. The district created a merit-pay score spreadsheet that was utilized to calculate the overall teacher designation. This form contains the designation status, as well as the student grown rating. The district utilizes an exit interview survey form that every exiting employee fills out before their last day of employment.

Data Analysis

Data collected from the district were uploaded into OOM software. Observation Oriented Modeling is an alternative data analysis method that is different from traditional statistics (Grice, 2014). It focuses on building models to determine which processes or structures might generate an observation (Grice, 2015). Observation Oriented Modeling does not focus on means, variances, or estimation of population parameters, but rather focuses on model building in order to identify the structures or process that generate an observation (Grice, 2015). Analysis performed in OOM focuses on identifying patterns where "observations are consistent with the predicted or identified pattern" and "provide[s] an index of a given pattern's robustness within a sample" (Grice, 2015, p. 15). Pattern analysis and ordinal pattern analysis (crossed and concatenated orderings) tests were used to test all hypotheses.

When conducting the analysis, two main data outcomes were used to evaluate the robustness of a pattern, the percent correct classification (PCC) and the c-value. The PCC indicated the percentage of times the expected pattern was obtained. The PCC value was represented on a scale from 0-100. The c-value was determined by how frequently one could get the obtained PCC value when the observations were randomized. The lower the c-value the less plausible the observed pattern was due to chance.

H1$_a$, H1$_b$, and H1$_c$ utilized pattern analysis (crossed orderings). H2 utilized an ordinal pattern analysis (crossed orderings) test. Where necessary, orderings were combined (e.g., all teachers who received a designation were combined into Group 1 to create a new logical ordering and this was compared to those who did not participate in the merit program in Group 2. Tables 1 and 2 are representative of predicted outcomes of each of the tests performed in OOM. Table 1 presents the logic of the pattern analysis (crossed orderings) test for H1a (similar to H1b, and H1c). Table 2 presents the logic of the ordinal pattern analysis (crossed orderings) test for H2.Where the high designation represents a combined group of teachers who received a masters or exemplary designation and the low group contains the recognized designation group.

Table 1

Example of H1a Prediction Tested by Pattern Analysis (Crossed Orderings)*

Retained	Received any level of merit- pay designation	Did not Participate in merit-pay program
Yes	X	
No		X

Note: "X" indicates the predicted pattern. Obtained PCC value indicates the number of individuals who fall within the predicted pattern. The c-value will indicate the degree to which chance plausibly played a role in producing the obtained PCC. ** It is important to note that those that did not participate had the same data collected, but chose not to participate in the program and do the extra work.

Table 2

Example of H2 Prediction Tested by Ordinal Pattern Analysis (Crossed Orderings)*

Growth Score	Participated in merit program	Did not participate in merit program
Higher	X	
Lower		X

Note: "X" indicates the predicted pattern. Obtained PCC value indicates the number of individuals who fall within the predicted ordinal pattern. The c-value will indicate the degree to which chance plausibly played a role in producing the obtained PCC. ** It is important to note that those that did not participate had the same data collected, but chose not to participate in the program and do the extra work.

For the first set of hypotheses, the pattern analysis test began by making comparisons of teachers who received any level of merit-pay designations versus those who did not participate in the merit-pay program. This shows the relationship between participation in the initiative and retention in the district. Similar tests were run for $H1_b$ comparing teachers who participated and received a merit-pay designation to those who participated and did not receive a merit-pay designation. $H1_c$ compared those teachers who received a high merit-pay designation to those who received a lower merit-pay designation.

The ordinal pattern analysis (crossed orderings) consists of pairwise comparisons: Person 1 in Group A was compared to all persons in Group B, followed by Person 2 in Group A being compared to all persons in Group B, and so on, until all individual-level response comparisons were made. The program then made the same comparison with the second person and so on. In the ordinal pattern analysis of the example in Table 2, the expectation was that teachers who participated in the merit-pay program would have higher student growth than those who did not participate. This example test compares the first teacher who participated in the merit-program and the growth of that teacher's students to the student growth of the teachers who did not participate, and then moves on

to the next teacher that participated and repeats the process as described. The tests conducted utilized the default randomization of 1000 times to calculate all c-values. The same ordinal pattern analysis was performed for each of the hypotheses.

Results

The first hypothesis predicted that teachers with any level of merit-pay would be retained at a higher rate than those who did not participate in the merit-pay program. The results of the test are represented in Table 3. The number of participants was indicated for each year for those who did and did not participate, as well as whether or not they were retained that year. In each of the 3 years, the majority of the teachers were retained in both conditions. The results of a pattern analysis test did not support the hypothesis for two of the 3 years studied. Only about 3 out of 10 times were the predicted pattern observed for 2020-21 (PCC 37.17; c-value .43) and 2021-22 (PCC 36.52; c-value .91). However, 64% of the time, the pattern was observed in 2022-23, but the results are plausibly due to chance (c-value .90)

Table 3

Retention of teachers with merit-pay vs. those who did not participate 2021-2023

Condition	2020-2021 Retained		2020-2021 Not Retained		2021-2022 Retained		2021-2022 Not Retained		2022-2023 Retained		2022-2023 Not Retained	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Merit-pay designation	40	98%	1	2%	41	100%	0	0%	12	96%	1	8%
Did not participate	70	97%	2	3%	73	98%	1	2%	64	89%	8	11%
Total	110		3		111		1		76		9	
PCC	37.17				36.52				63.73			
C-value	0.43				0.91				0.9			

Note: *PCC and c-value for Pattern Analysis *(Crossed Orderings) test indicating how many teachers with merit designation were retained, and how many teachers who did not participate were not retained. ** It is important to note that those that did not participate had the same data collected, but chose not to participate in the program and do the extra work.

The second hypothesis predicted that teachers who participated in the merit-pay program and received any level of merit-pay would be retained at a higher rate than those who did not receive a merit-pay designation. Table 4 represents the data from the test, and contains the number and percentage of the school population who received a merit-pay designation or did not qualify and the retention of each group for the 3 years. In all 3 years, the majority of the teachers were retained. The results of a pattern analysis test indicated that approximately 7 out of 10 would be retained if a merit-pay designation for 2020-21 (PCC 68.25; c-value .04), 2021-22 (PCC 71.19; c-value .58), and for 2022-23 (PCC 73.91; c-value .47). In 2020-2021, the results indicated a modest likelihood that merit-pay designation does increase retention. In years 2021-22 and 2022-23, the c value indicated that that it is highly plausible that the observation could be obtained by chance. However, 64% of the time, the pattern was observed in 2022-23, but the results are plausibly due to chance (c-value .90).

Table 4

Retention by level of merit-pay designation 2020-2023

Condition	2020-2021				2021-2022				2022-2023			
	Retained		Not Retained		Retained		Not Retained		Retained		Not Retained	
	n	%	n	%	n	%	n	%	n	%	n	%
Merit designation	40	98%	1	2%	41	100%	0	100%	12	96%	1	8%
Did not Qualify	19	84%	4	6%	17	94%	1	6%	57	89%	7	11%
Total	59		5		58				69		8	
PCC	68.25				71.19				73.91			
c-value	0.04				0.58				0.47			

*PCC and c-value for Pattern Analysis *(Crossed Orderings) test indicating how many teachers with merit designation were retained, and how many teachers who did not qualify were not retained

The third hypothesis predicted that teachers who received a high designation would be retained at a higher rate than those who received a low designation. Teachers who received a masters' degree or an exemplary designation were combined to form the high group, and teachers who received a recognized designation teacher were in the low designation group. In each of the 3 years tested, there was a 50% chance that someone with a high designation would be retained at a higher rate than those with a low designation. The chance value for 2021-22 (.43), 2021-22 (.23), and 2022-23(.63) indicated there was a high likelihood the values could be replicated by chance.

Table 5

Retention of teachers with high vs. low merit designation 2021-2023

	2020-2021				2021-2022				2022-2023			
	Retained		Not Retained		Retained		Not Retained		Retained		Not Retained	
Condition	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
High designation	22	95%	1	5%	21	95%	1	5%	3	100%	0	0%
Low designation	18	100%	0	0%	18	100%	0	0%	7	100%	0	0%
Total	40		1		39		1		10		0	
PCC	53.66				51.22				46.15			
c-value	0.43				0.23				0.63			

*PCC and c-value for Pattern Analysis *(Crossed Orderings) test indicating how many teachers with a high merit designation were retained, and how many teachers with a low designation were not retained

Hypothesis 2 expected that those who participated in the merit-pay program would have higher student growth scores than those who did not participate. The test district did not have growth data in the 2021-2022 school year due to the pandemic; however, growth data for the 2020-2021 and 2022-2023 school year data was available. The ordinal analysis (crossed orderings) tests of 2 years were analyzed. Growth scores and the number of participants for each growth score are represented on Table 6 for both of the year's data were available. The growth scores range from 3.0 to 4.5. Teachers who received a growth score of 3.7 or higher were able to obtain a growth designation. Teachers who received a growth score over 3.7 and did not participate did not receive a merit-pay designation. The results for 2020-21 support the hypothesis, indicating a moderately strong relationship between those who participated in the merit-pay program and the student growth measures (PCC 59.84; c-value .001). Results for 2022-23 showed that 62.45% of the time those who participated had higher student growth scores (c-value .001) than those who did not participate.

Table 6

Student growth of teaches who participated vs. those who did not participate 2020-21 and 2022-23

| Growth | 2020-2021 | | | | 2022-2023 | | | |
| | Participated | | Did Not Participate | | Participated | | Did Not Participate | |
	n	%	*n*	%	*n*	%	*n*	%
3	23	37%	65	86%	25	38%	67	92%
3.2	0	0%	0	0%	1	1%	0	0%
3.5	0	0%	0	0%	15	23%	4	5%
3.7	9	14%	8	10%	13	20%	2	3%
3.73	1	1%	0	0%	0	0%	0	0%
3.9	13	21%	1	1%	12	18%	0	0%
4.5	17	27%	2	3%	0	0%	0	0%
Total	63	100%	76	100%	66	100%	73	100%
PCC	59.84				62.45			
c-value	0.001				0.001			

*PCC and c-value for Pattern Analysis *(Crossed Orderings) test indicating teachers who participated in the merit-pay program were retained, and teachers who did not participate were not retained. ** It is important to note that those that did not participate had the same data collected, but chose not to participate in the program and do the extra work.

To further explore the results from the ordinal analyses, a Build Test model was conducted in OOM to produce a histogram of Hypothesis 2a. This test identifies pattern without a pattern being specified by the researcher (post hoc). This was conducted to see if the same pattern would be observed using a binary Procrustes rotation. The results were represented in Figure. 1 for 2020-21, and Figure. 2 for 2022-23. In 2020-21, 65 of the student growth scores were represented with the growth scores of 3.00 by those who did not participate, where only 23 scored in the 3.00 for those who did participate (PCC 75.54, c-value here; see Table 1 for percentages in each growth category). The 2022-23 year shows similar results with 67 student growth measured in the 3.00 range while the group that participated had only 25 (PCC 77.70, include c-values here, in addition to the

figures). The vast majority of teachers with higher growth ratings found among teachers who participated in the merit program.
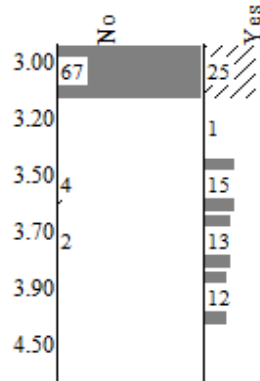
Figure 1	**Figure 2**
*2020-2021 Student growth scores of teachers *	*2022-2023 Student growth scores of teachers*
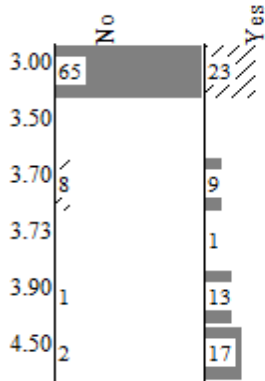
Percent Correct Classifications (PCC) = 75.54
A total of 139 observations are plotted.
■ = Correctly classified observation
☑ = Incorrectly classified observation
☐ = Ambiguously classified observation

Percent Correct Classifications (PCC) = 77.70
A total of 139 observations are plotted.
■ = Correctly classified observation
☑ = Incorrectly classified observation
☐ = Ambiguously classified observation

Note: For Figure 1 and 2, The vertical axis is the student growth scores, and the vertical axis is participatoin in the merit-pay program; c-value = .001

Discussion

Summary

States and districts are looking for ways to retain qualified staff in school districts. The latest approach in Texas is the Teacher Incentive Allotment. This plan seeks to pay teachers a bonus to raise the pay of teachers to a six-figure salary. The study results indicated no consistent relationship between merit-pay and retention or merit-pay rating and retention; this was at least in part due to the small number of non-retained teachers. When comparing those who participated and did not receive a designation and those who did receive one it was determined to have a lack of, a relationship was observed when

comparing those who had a merit designation and those who did not participate in the program. When reviewing the level of designation, there was no relationship identified between those who received a high and those who received a low designation.

The study revealed a relationship between student growth and participation in a merit-pay program. The research question was whether there was a relationship between student growth and the teacher's participation in the merit-pay program. In both years with available student growth data, the results indicated a strong relationship. Those who did participate in the merit-pay program saw larger student growth data than those who did not participate.

Literature Comparison

Many factors have impacted teacher retention. Merit-pay compensation was noted as a factor that could affect retention. (Döckel et al., 2006; Nguyen, 2020). Denver Public Schools adopted the professional compensation system for teachers, which added student growth to the pay system (Podgursky & Springer, 2007). Hendricks (2014) and his work concluded that pay reduces turnover, and Weldon (2011) stated money is the main reason teachers stay in education.

The results of the study do not support the thought that teachers will be retained based on their pay. This indicates that in relationship to Maslow's theory of needs, the teacher in this study had needs that were more influential than the need to have more money. The teachers who left the test district left for two major reasons: retirement and moving for a promotion or for family reasons.

Hendricks (2014) indicated that there was an impact on student achievement based on an increase in teacher pay. Fryer (2011) conducted a study in New York and

determined there was no statistically relevant change in the performance of students. Springer et al. (2012) also evaluated a group-based incentive program and found that it did not have a positive effect on student achievement. The information from this study does not agree. Based on the data from this study, there was a positive relationship between participation in a merit-pay program, and student achievement. The Hawthorne effect expected this result. The theory states there is an observable difference when being watched (Elston, 2021). This is coupled with Vroom's expectancy theory, which states that expectations are met when you know what they are. Student growth scores increased because teachers knew the expectation for them to grow, and those scores would be looked at by the teacher.

Limitations

There were a few limitations to this data set. The first limitation is the number of participants who were not retained, in each of the three years analyzed the turnover was less than 9 individuals. Another limitation the affects the study was that COVID 19 pandemic which began in the spring of 2020. During the years following the pandemic and school shutdowns, there were changes that were present for the next few years and continue through the 2022-23 school year in some regards. Schools had students who were virtual and at home all year, and there was a lot of fear around attending school. Schools had to quarantine students and teachers and send them home for 10-14 days, depending on a positive test for COVID-19. The testing system in Texas for that year did not take place, and the following year scores were not viewed as reliable due to the conditions due to COVID. There was an unusual set of years for student growth due to students on remote instruction. The uncertainty of the economy, and what was going on,

generated a lower turnover than had been previously observed. The Texas Education Agency (2023) released a statement on September 12, 2023 delaying accountability ratings. This postponement was due to the data from 2021-22 growth being more anomalous than expected, and the baselines were harder to set. The Texas Education Agency (2023) reported that the data did not adequately account for the impact of the pandemic. Additionally, during this time the Texas Education Agency released a redesign of the STAAR test. The first administration of the test is in the 2022-23 school year. This test contained different question types that had not previously been used and included more writing across all courses (TEA, 2022).

Implications

The results of the study indicate that there was not a noticeable difference in retention if someone received a merit-pay designation or not. However, it did show that there was greater growth for students if their teacher was participating in the merit program. Schools that can find ways to encourage teachers to engage in programs would have an impact on student achievement.

With multiple studies indicating that money was not always a motivator for retention, policy-makers should investigate applying money to other factors, such as class size and its impact to affect student growth and retention. Policy-makers could pass legislation to increase funding to school district, so that the districts can decrease class sizes. Elementary classes already have a limit of 20 students in a class up to the 4th grade. Funding to expand this requirement to all other classes could have an impact on learning and could motivate retention. Since there is a relationship to student achievement and participation in the program, policy-makers can also investigate how to increase

engagement in programs, such as the Teacher Incentive Allotment. They can increase the amounts of possible bonuses, decrease the burden on the districts who manage the programs by finding program supports so teachers get 100% of the bonus instead of 90%.

The study indicated that the motivation factors based on the qualitative study could have been obtained by chance and did not have a strong relationship. As a result, a qualitative study in the future could help identify the impact of other motivation factors for retention. Taking time to collect data from their perceptions of additional pay, their motivating factor of retention could help find the reasons teachers stay or go. In addition to an exit survey checklist, an exit interview could get more specifics on the reasons a teacher leaves a district. A qualitative study could also investigate the impact of money on teacher decision-making when deciding to leave or stay in a district.

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