

THE RELATIONSHIP OF TEACHER TURNOVER AND STUDENT ACHIEVEMENT IN  
ELEMENTARY SCHOOL MATHEMATICS

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## DEDICATION

To my wife, Brenda, thank you for continually believing in me. The last few months have been especially difficult and I would not have been able to complete this process without your support and sacrifice. Your encouragement kept me going through the ups and downs and helped me believe in myself when I needed it most.

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## ABSTRACT

AARON LANDON TURRUBIARTE, M.Ed.

### THE RELATIONSHIP OF TEACHER TURNOVER AND STUDENT ACHIEVEMENT IN ELEMENTARY SCHOOL MATHEMATICS

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The purpose of this study was to investigate the impact of teacher turnover on student achievement in grades three through five in mathematics and campus ratings from accountability systems. For this study, teacher turnover rates, student achievement scores, and economically disadvantaged (ED) percentages of 2,838 elementary campuses in Texas were used. Publicly available retrospective data from the Texas Education Agency was used and made available through online sources and public information requests (PIRs). The results of the study indicate a negative correlation between teacher turnover and student achievement and a negative correlation between teacher turnover and overall campus ratings from accountability systems. The ED status of a campus was not a significant predictor of teacher turnover.

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# CHAPTER I

## INTRODUCTION

Teacher turnover negatively affects student learning (Sorensen & Ladd, 2020; Vagi et al., 2019; Weddle et al., 2021) and is a concern for educators and policymakers (Atteberry et al., 2017). Teacher turnover can occur because of attrition from the profession or mobility across schools (Brummet et al., 2017). For this study and in the data collection, teacher turnover is defined as educators in the previous school year but no longer in the profession during the succeeding school year. Teacher turnover and teacher attrition will be used synonymously for this study.

Although teacher turnover occurs for different reasons, researchers discovered a variety of motives, including student characteristics, teacher characteristics, school and organizational contexts, and governmental policy. Although much of the data reveals the negative impact of student achievement, some researchers suggested that not all teacher turnover harms student achievement (Ronfeldt et al., 2013; Wronowski, 2021). Previous research that indicated negative effects of teacher turnover on student achievement (Nguyen & Kremer, 2022; Sorensen & Ladd, 2020) has been supported by the findings of this study, specifically in grades three through five in math as measured through standardized assessments by the Texas Education Agency (TEA).

In addition to the overall adverse effects of teacher turnover on student learning, researchers have pointed to specific, negative effects on certain populations of students. These populations include students identified as economically disadvantaged (ED) and non-White (Loeb et al., 2005; Ronfeldt et al., 2013; Zilanawala et al., 2018). Specifically addressed in the literature, but not addressed in this study, is the difference in teacher quality related to turnover

as it occurs in campuses serving high populations of ED, non-White students. The ED characteristics of a campus to research its impact on teacher turnover were used in this study.

Finally, through this study the relationship between school ratings and teacher turnover was explored. Although accountability systems differ nationally and internationally, cross-sectional data from accountability systems in Texas through the TEA during the 2021-2022 school year were specifically used. Policymakers consider the need for accountability systems to promote student performance while acknowledging the accountability system may cause teacher turnover and make attracting teachers more difficult (Dizon-Ross, 2020). Previous research is supported by the findings of this study, which suggested that lower-performing schools or schools that receive low ratings from accountability systems experience high teacher turnover (Clotfelter et al., 2004; Gjefsen & Gunnes, 2020).

### **Context of Study**

The relationship between student achievement in math in grades three through five, teacher turnover, and school rating was explored through this study. The variables of student achievement, teacher turnover, and school rating to the ED status of students were compared through this study. Miller and Youngs (2021) concluded that campuses with high teacher turnover rates often replace departing teachers with those having little to no experience. Researchers further suggested campuses that experience continual teacher turnover often had reduced instructional effectiveness (Simon & Johnson, 2015).

In addition to school variables, governmental policy can impact student achievement scores. Governmental policy at the federal level in the United States and the state level, specifically in Texas, influences public school accountability related to student achievement on standardized assessments. The Every Student Succeeds Act (ESSA, 2015) is the federal policy

governing student accountability in the United States. Under the direction of the ESSA, states must monitor student achievement, close achievement gaps, and address low-performing schools. Schools can experience increased pressure due to accountability systems (Gjefsen & Gunnes, 2020), especially those in low-performing schools (Weddle et al., 2021). The research questions in this study directly relate to school ratings through accountability systems developed by the TEA. Specifically, a focus of one research question in this study was on the variable of a school rating score as it relates to teacher turnover.

### **Rationale**

Teacher attrition and teacher turnover have been used throughout the literature to describe classroom teaching personnel changes (DeAngelis & Presley, 2011; Moon et al., 2020). Researchers often link high rates of teacher turnover to a negative impact on student achievement (Adnot et al., 2017), which then impacts the school rating. In their research on teacher turnover, Clotfelter et al. (2004) observed increased turnover rates from both experienced and novice teachers when school ratings dropped from poor scores on student standardized assessments. This observation, also supported by teacher survey data, is important because it suggested that lower-achieving schools are viewed as less desirable for teachers, which creates concern for policymakers of accountability systems (Dizon-Ross, 2020). When a school becomes less desirable because of poor performance on standardized assessments, an increase in teacher turnover is likely to occur, which may make a school less appealing to new teachers (Falch & Rønning, 2007). However, a school's performance score is just a singular variable that may not explain all teacher turnover on the campus. An additional component of turnover at underperforming, less desirable schools could also affect their hiring ability and the quality of teachers replacing those who leave.

Campus ratings in Texas are awarded by the TEA in three separate domains, which are (a) student achievement, (b) school progress, and (c) closing the gaps (TEA, 2022a). The final overall campus rating was a combination of the three domains. The numerical score from the combination of ratings was converted to a letter grade or categorical grades (TEA, 2022a). Letter grades (rating labels) are awarded as A, B, or C and the categorical grades are: Not Rated, Not Rated: Senate Bill 1365, Not Rated: Data Under Review, Not Rated: Data Integrity Issues, or Not Rated: Annexation.

### **Teacher Turnover, Equity, and Student Characteristics**

A particular concern of teacher turnover is the high rates of attrition on certain types of campuses. Specifically, campuses with high minority and high-poverty student populations will systematically be subject to diminished educational experiences because of high levels of teacher turnover (Scafidi et al., 2007). Through this study, a better understanding of not only the relationship between teacher turnover and student math achievement in grades three through five but the implications on high needs campuses which may be systemically subject to higher turnover rates was sought. High teacher turnover rates negatively impact student achievement specifically on campuses which are disproportionately high minority and have high rates of low socioeconomic status (SES) in their student populations (Watlington et al., 2010).

Concerns about equity in education are identified in the literature when determining the impact of teacher turnover on student achievement (Falch & Rønning, 2007). Two specific themes of equity center around SES and race or ethnicity. For this study, student and campus characteristics were discussed synonymously as SES and race or ethnicity demographic information. These characteristics are necessary to understand in the relationship between teacher turnover and student achievement because campuses are heterogeneous. Researchers

observe high teacher turnover rates on campuses with low student achievement scores, high numbers of low SES, and high minority student populations (Loeb et al., 2005; Watlington et al., 2010).

### ***SES***

A student characteristic observed in the literature related to student achievement and teacher turnover is SES. The SES of a campus was a variable used in this research. SES was a variable on which the federal government based its federal programs, such as the National School Lunch Program (NSLP), which continues to operate. Founded in 1946, the NSLP offers free lunches to students if their household income is less than 130% of the poverty line. Reduced-price lunches are available to students whose household income is between 130% and 185% of the poverty line. The free and reduced-price lunch program (FRLP) participation is an indicator of the SES of the student and is combined to reflect the SES of a campus (Domina et al., 2018). Additionally, the campus considers students participating in the FRLP as economically disadvantaged. The campuses record this classification of economically disadvantaged based on individual student need and reported as an overall percentage of the campus. The overall reported percentage of economically disadvantaged students was used for this study.

Individual student characteristics, such as SES, are combined and reported to explain the makeup of a student population on a particular campus. Higher rates of low SES student populations contribute to disparities in student outcomes (Gustafsson et al., 2018; Kotok & Knight, 2022), which raises the concern of equity previously mentioned. Achievement gaps can widen due to high teacher turnover rates on campuses with higher numbers of low SES students (Steele et al., 2015). Specifically related to this study, Kotok and Knight (2022) found that

students with low SES were more likely to attend a school that had difficulty staffing math teachers resulting in lower student achievement scores in math. This is important to understand because researchers observe lower-performing schools supporting predominant student populations who are categorized as economically disadvantaged (Blizard, 2021b).

### ***Minority Student Populations***

The effect of specific student characteristics, such as minority populations, on teacher turnover can be difficult to disentangle in the literature. Although campus demographics, such as race and ethnicity, can play a role in teacher turnover, their relationship seems intertwined with other variables like work environment or administrator actions. For example, a campus with high minority populations may not contribute to teacher attrition, but the conditions of both student and school poverty may be contributing factors (Robison & Russell, 2022). Scafidi et al. (2007) suggested that the idea of teachers being more likely to leave high poverty schools is related to the high-poverty school that also has higher numbers of minority students and could be attributed to teacher dissatisfaction related to student motivation, discipline, or lack of administrative support (Kotok & Knight, 2022; Loeb et al., 2005). In other words, although SES can factor into teacher attrition, the racial or ethnic profile of a school is a more specific determining factor.

Further entangling of the relationship between race and ethnicity of students and teacher turnover occurs when observing teacher demographics. Boyd et al. (2005) suggested that teacher turnover of white and Hispanic teachers increases as the proportion of white students, relative to African American students, decreases. Researchers observed a relationship between teacher turnover and a teacher's race or ethnicity. The point of understanding the race and ethnicity of a campus is that campuses with higher minority populations experience higher turnover rates, which will lead to a lower quality teaching base year-to-year, thus reducing student achievement

(Kotok & Knight, 2022; Steele et al., 2015). Campuses comprised of high minority populations and low-SES populations experience higher rates of teacher turnover (Watlington et al., 2010).

### **Teacher Quality and Turnover**

A more complex element of teacher turnover is teacher quality. Ronfeldt et al. (2013) described the relationship between the quality of a teacher and the impact on student achievement as compositional change. The compositional phrase used was about the profile of teacher quality on the campus. Teacher quality, also known as value-added, is described by Dizon-Ross (2020) as a teacher's contribution to student learning and measured by student achievement gains (Henry et al., 2014). Furthermore, the quality of a teacher is defined, in part, by their characteristics, such as years of teaching experience, earning an advanced degree, attending a competitive college, and undergraduate grade point average (Steele et al., 2015). The observable characteristics of teachers to determine their quality and subsequent impact on student learning was not used in this study. Researchers cannot easily link teacher characteristics to student achievement (Dizon-Ross, 2020); however, the literature does attempt to understand the relationship of teacher characteristics in value-added measures and the ensuing impact on student achievement (Boyd et al., 2005; Clotfelter et al., 2004; Gjefsen & Gunnes, 2020). If researchers observe a difference in quality between the teacher who leaves and the teacher who replaces them, observable changes to student achievement will occur (Ronfeldt et al., 2013).

In addition to recognizing a difference in teacher quality, researchers often assume teacher turnover negatively impacts student achievement though some studies suggested the opposite effect (Ronfeldt et al., 2013). Attrition, in general, could be either positive or negative depending on the teacher leaving and teacher entering the school (Loeb et al., 2005) and if there is a quality difference between the teacher leaving the school and the teacher entering the school,



such as low-quality to high-quality (Gjefsen & Gunnes, 2020). For example, if a highly effective or high-quality teacher replaced a low-quality teacher, student achievement would most likely improve. If a highly effective teacher was replaced by a lower effective or ineffective teacher, student achievement would most likely diminish. Again, the literature links the determination of the quality or effectiveness of a teacher and their impact on student achievement through teacher characteristics, which may not be easily understood (Dizon-Ross, 2020). The literature surrounding quality, effectiveness, or value-added measures of a teacher is acknowledged in this study. However, it does not attempt to use them to understand the relationship of teacher turnover and student achievement.

Teacher quality, turnover, and student achievement are observed in the literature as factors related to novice teachers replacing experienced teachers. A novice or inexperienced teacher are those with 2 years or less of experience in the teaching profession (Vagi et al., 2019). High teacher turnover rates result in disproportionate numbers of inexperienced teachers on a campus (Loeb et al., 2005). The assumption is that a newly hired novice teacher is less effective than an experienced teacher who leaves. Although inexperienced and ineffective are not synonymous, institutional disruptions from replacing experienced teachers with inexperienced teachers could negatively affect student achievement (Adnot et al., 2017) because of the lack of teacher expertise in curriculum and continuity of instruction (Loeb et al., 2005).

The desirability of a campus may affect the attrition decision of novice teachers. In their research on teacher mobility, Scafidi et al. (2007) found that teachers are more likely to change schools when they begin their career with populations of students who are low achieving, high poverty, or high minority. This finding does not necessarily explain all functions of novice teacher mobility and student characteristics, but it does acknowledge the relationship between

novice teachers' response to student characteristics and turnover. If already high-performing, desirable schools prefer experienced teachers, this forces novice teachers to begin their careers in less desirable schools (Falch & Rønning, 2007).

In a study on teacher turnover and student academic performance in public schools in the state of North Carolina, Blizard (2021b) concluded campuses that received the top letter-grade rating by the state had less than half of the attrition rates as those that received the lowest letter-grade rating. This is important because campuses with higher attrition rates also received lower letter-grade ratings demonstrating a correlation between teacher turnover and student achievement, specifically at campuses serving disproportionate numbers of ED students.

Additionally, teachers at schools rated as low or underperforming incur additional stress from reform systems designed to increase student performance (Weddle et al., 2021), which could result in higher teacher turnover rates. With increased turnover rates, the ability to establish strong, collaborative cultures and foundational instructional practices could be diminished, resulting in lower student performance. Diminished academic performance in schools experiencing high teacher turnover rates has been noted previously in the literature (Ingersoll, 2001).

Researchers have studied student characteristics, such as poverty, mobility, language acquisition, and special program participation as links to student achievement (Blizard, 2021b; Gjefsen & Gunnes, 2020; Gustafsson et al., 2018; Tang et al., 2021). Although these characteristics can impact student performance, these factors are beyond the control of the teacher, school, and district (Tang et al., 2021). A perspective on the relationship between teacher turnover, school rating, and ED student percentages was provided through this study.

## **Purpose of Research**

To better inform district and school administrators about the relationship between characteristics that may influence local policy decisions to reduce teacher turnover and improve student achievement was the intent of this study. Based on standardized test scores, this study examined the relationship between teacher turnover and student achievement in elementary mathematics in third grade through fifth grade. Because school factors, such as SES, contribute to disparities in student outcomes (Gustafsson et al., 2018), the study also explored the relationship of SES and student achievement. The standardized test scores of students in this study are specifically from the State Assessment of Academic Readiness (STAAR) delivered through the TEA on individual campuses. As the primary instructor of students, the longevity and consistency of the classroom teacher is critical to student achievement.

## **Research Questions**

The research questions that guided this study include:

R1: How does teacher turnover predict math achievement in third, fourth, and fifth grade students?

R2: How does school rating and economically disadvantaged status predict teacher attrition rate among Texas elementary schools?

## **Methodology**

For this quantitative study, publicly available retrospective data was requested and used from the TEA. The data was accessed on TEA websites, research portals, and, when not directly available on these sources, through public information requests (PIRs). The TEA is a state agency that governs public schools and is responsible, in part, for the administration of the statewide assessment program and accountability system (TEA, 2024c). A commissioner,

appointed by the governor of Texas, oversees the agency along with an elected state school board of education (SBOE). The SBOE is responsible for the guidance and monitoring of public education affairs in Texas (TEA, 2024c). The data sets, which are available to the public and used in this study, include achievement scores from standardized assessments required by the TEA, campus accountability ratings assigned by the TEA, and classroom teacher mobility rates. Observing the relationships, if any, between student math achievement in grades third through fifth, campus accountability ratings, and teacher mobility was a focus of this study.

For this study, correlations and a multiple regression with descriptive statistics were used. This analysis was modeled from Blizard (2021b) and Tang et al. (2021) who focused on the impact of teacher variables, including turnover, on student performance. The TEA requested data for the 2021-2022, which provided student achievement scores on the STAAR mathematics in grades three, four, and five, teacher turnover percentages, economically disadvantaged percentages, and school rating designations for the included campuses. The intended sample included public elementary schools in the state of Texas. Charter schools and intermediate schools were excluded from the study since traditional and non-charter schools were the focus, and it made it more relevant to address the research questions by reviewing data pertaining to elementary campuses serving grades early education through fifth grade, pre-kindergarten through fifth grade, and kindergarten through fifth grade. The purpose of the study allowed for a better understanding of the relationship of teacher turnover, student math achievement in grades third through fifth, and campus ratings at the elementary school level. In order to gain a larger sample size, campuses serving grades early education through fifth grade, pre-kindergarten through fifth grade, and kindergarten through fifth instead of campuses only serving grades third through fifth were studied.

## **Significance of the Study**

This study builds upon the current literature and adds a contribution to the relationship of teacher turnover, student achievement, and school ratings, specifically in the state of Texas. This study on teacher turnover is important because of the impact on student performance and the resulting school rating derived from scores on student standardized assessments. The TEA requires students to take the STAAR beginning in third grade for both math and language arts. Because the TEA awards school ratings, in part, by student achievement on the STAAR (TEA, 2022a), student scores play a significant role in determining negative consequences that may follow for poor performing schools. Schools that experience high teacher turnover rates often serve high numbers of economically disadvantaged students and, consequently, receive lower school ratings (Blizard, 2021b).

The significance of this study was to reveal that teacher turnover negatively affects student academic performance (Hanushek et al., 2016; Tang et al., 2021). Through this study, a contribution was made to the literature by showing a specific analysis and determining the impact of teacher turnover on standardized achievement scores of students in the elementary setting in the state of Texas. Because state mandated assessments begin in elementary grade levels, it is essential for school administrators and policymakers to better understand the significant impact that teacher turnover rates have on student achievement and, specifically, campuses serving high numbers of economically disadvantaged students.

## **Limitations**

Limitations in this study were similar to those of Kotok and Knight (2022) who used cross-sectional data which hindered the ability to interpret longitudinal effects using contextual factors in a single year. One limitation is that the researcher is a current elementary school

principal in a fast growth district in north Texas with prior teaching experience at the middle school level. The researcher's professional knowledge of student learning and hiring needs on a campus prompted the specific interest of the proposed research as the field of public education continues to evolve and grow. Because the researcher is active in the career field of the study, biases could be present; however, data used and collected by the researcher provided by a third party government agency and outcomes were used to inform professional practice across the industry. Furthermore, the data used by the researcher were not schools that the researcher was exclusively affiliated with.

Another limitation of the study is that it does not consider all possible reasons teacher turnover may exist. Although the focus on this study was on teacher turnover, school rating, and student achievement, it is necessary to point out that why teacher turnover happens was not a focus, mainly due to the many variations of answering the "why" of the turnover or attrition. Teacher turnover could include teachers accepting promotions or alternative positions within education, such as, a counselor, administrator, or instructional specialist. In this study, teacher attrition includes classroom professionals defined as movers and leavers (DeAngelis & Presley, 2011; Hahs-Vaughn & Scherff, 2008; Moon et al., 2020; Robison & Russell, 2022), but these terms were not explored in this study because it was not present in the data that was collected by the TEA. Although these terms and definitions may add evidence to the existence of teacher turnover, it was not within the scope of this study.

A third limitation of this study explored the quality of a teacher and mechanisms to determine teacher quality. Without understanding the overall and subsequent effect on teacher quality from turnover, researchers found it difficult to draw conclusions of teacher turnover on student achievement (Ronfeldt et al., 2013). Hence, it was not a part of the TEA data and

research found on teacher quality as it relates to teacher turnover, school ratings, and student achievement was not clear. Further research on the mechanisms to determine teacher quality and their impact on student achievement are necessary to better understand how an effective or ineffective teacher promotes student achievement.

Finally, the study drew on all public, non-charter elementary schools serving pre-kindergarten through fifth grades or kindergarten through fifth grades as the sample in the state of Texas. The study did not include intermediate campuses, which can serve third through fifth grades, which are also required to take the standardized assessment delivered through the TEA. Because of the exclusionary and inclusionary criteria, generalizability of the study could be limited across campuses serving elementary level students and across Texas. Additionally, the study only included student achievement data on the STAAR test which is exclusive to the State of Texas through the TEA and not a nationally delivered assessment.

### **Definition of Terms**

Accountability Systems: (a) The federal government and state governments develop policies to measure student achievement. The federal policy is the ESSA. States may develop unique policies but must be aligned to federal guidelines. Student achievement data on standardized assessments are used in reporting progress within the accountability system; (b) Performance ratings are assigned to schools and districts based, in part, on student achievement scores respective to the accountability system design.

Economically Disadvantaged: (a) Poverty rates established by the United States federal government FRLP were used to identify students as ED; (b) Students whose family incomes are at or below 130% of the federal poverty level are eligible for free meals at school; (c) Students

whose family incomes are between 130 and 185% of the federal poverty level are eligible for reduced price meals at school (Domina et al., 2018).

Student Achievement: (a) Standardized assessments are used to measure the academic progress of students; (b) The STAAR measures student achievement in grades three through twelve.

Teacher Turnover: *General*. Educators in the profession the previous school year but no longer in the profession in the same location or classroom during the succeeding school year.

(1) *Movers* are a type of teacher turnover in which a teacher moves from a campus or district to another and is still in the teacher profession;

(2) *Leavers* are a type of teacher turnover in which a teacher has left the profession entirely;

(3) *Reassignment* is a type of teacher turnover in which a teacher is still in the profession but is reassigned to another grade level within the campus or district.

### **Summary**

Through this study, teacher turnover, defined as attrition from the profession or mobility, from different perspectives, including student and teacher characteristics, organizational contexts, and governmental policy has been examined (Atteberry et al., 2017; Sorensen & Ladd, 2020; Vagi et al., 2019; Weddle et al., 2021). A determination of the relationship, if any, between teacher turnover, student achievement in grades three through five in math, and school rating determined from accountability systems in the state of Texas was sought through this study. Hence, correlations and a linear regression analysis to determine the relationship were completed. Many limitations were involved in this study, including only using cross-sectional data collection from one school year, highlighting turnover, but not considering factors causing



teacher turnover, and not exploring effectiveness of teachers leaving the school or profession.

Knowing that teacher turnover negatively impacts student achievement, evidence on relationships between specific grade levels, teacher turnover, school ratings, and ED percentage of a campus is provided in this study

## CHAPTER II

### LITERATURE REVIEW

#### **Introduction**

Included in this literature review are studies related to the impact of teacher turnover on student math achievement in grades three through five, socioeconomic status, and school ratings, specifically in the state of Texas. Themes discussed in this literature review include (a) student achievement and teacher turnover, (b) school ratings and teacher turnover, (c) socioeconomic status, student achievement, and teacher turnover, and (d) school leadership and teacher turnover. For this study, criteria, such as years of experience, teacher effectiveness, and student achievement to determine causes of teacher turnover were observed. Additionally, when researching on teacher resilience, it was concluded that both novice and veteran teachers depart for a multitude of the same reasons, including low pay, student discipline, and lack of administrative support; however, the reasons do not lead to the same outcomes (Muller et al., 2011). For example, while both novice and veteran teachers may cite departing the profession for low pay, other teachers with the same experience level do not make the same decision to exit the profession despite similar conditions.

Teacher turnover can impact student achievement differently based on the teachers' leaving or staying. A single conceptual or operational definition for "teacher turnover" does not exist in the literature because researchers studying this area often have different focuses and data sources which require their own definition for the purpose of their study (Weldon, 2018). For the purposes of this study, teacher turnover will be defined as educators no longer at the current school or no longer in the profession. This operational definition was based on the study of new teachers by DeAngelis and Presley (2011). If the least effective teachers leave the campus and

the highly effective teachers stay, student achievement would be expected to increase. However, the converse could be true; if the least effective teachers stay and the highly effective teachers leave the campus, then student achievement would be expected to decrease (Stuit & Smith, 2012). Although some studies isolated teacher qualities to student outcomes, teacher turnover encompasses both effective and ineffective teachers as part of the educator workforce. In this literature review, previous research on teacher turnover to demonstrate associations between student achievement, school ratings, and other campus related factors is included.

### **History of Teacher Turnover**

Teacher turnover has been a topic of research for many years due to the impact of losing a teacher in some capacity has on student achievement. In addition to negative impacts on student achievement, teacher attrition can also have negative financial impacts on districts (Nguyen & Kremer, 2022). Although turnover itself may be beneficial if ineffective teachers leave a campus, student outcomes could be adversely affected if the incoming teachers are also ineffective (Sorensen & Ladd, 2020). In some cases, districts were able to replace ineffective teachers with effective teachers, which improved student outcomes (Adnot et al., 2017). Although this is not the norm, if turnover exists on a campus this is the ideal scenario in order to improve student outcomes.

Researchers have studied teacher turnover from the perspective of the entire educator force and in specific subjects, such as mathematics, language arts, science, music, gifted and talented, and special education (Nguyen & Kremer, 2022; Sorensen & Ladd, 2020). Figure 1 represents the TEA's historical changes of teacher attrition in Texas from 2011-2012 to 2022-2023 and includes educators in all subjects employed by the state. Teacher turnover was steady from between the 2011-2012 and 2019-2020 school years at approximately 10% per year. The

lowest point of teacher turnover reflected in Figure 1 was in the 2020-2021 school year at 9.34%. Although data from the 2022-2023 school year was not used in this study, Figure 1 represents a slow climb in teacher turnover in the last couple of years. The increase in teacher turnover was observed in the United States by researchers who suggested that more teachers may leave the profession due to stress from COVID-19 policy implementation and political stress brought into the classroom (Bacher-Hicks et al., 2023; Will, 2022).

**Figure 1**

*Depiction of Historical Teacher Attrition in Texas*

Academic Year	Number of Teachers	Attrition from Previous Year		New Hires	
		Number	Percent	Number	Percent
2022-23	371,650	49,782	13.44%	51,001	13.72%
2021-22	370,431	42,841	11.57%	42,972	11.60%
2020-21	370,300	33,946	9.34%	40,723	11.00%
2019-20	363,523	36,474	10.16%	41,082	11.30%
2018-19	358,915	37,298	10.43%	38,691	10.78%
2017-18	357,522	36,900	10.44%	40,977	11.46%
2016-17	353,445	35,964	10.34%	41,728	11.81%
2015-16	347,681	35,747	10.43%	40,593	11.68%
2014-15	342,835	34,557	10.31%	42,079	12.27%
2013-14	335,313	34,387	10.48%	41,554	12.39%
2012-13	328,146	34,301	10.55%	37,284	11.36%
2011-12	325,163	35,577	10.58%	24,547	7.55%

*Note.* This table was produced by the Texas Education Agency depicting statewide annual attrition rates from 2011-2012 to 2022-2023. From *Employed Teacher Attrition and New Hires 2011-12 through 2022-23* (p. 1), 2023. In the public domain.

Additionally, policymakers have considered the potential negative effects of accountability systems on teacher turnover (Atteberry et al., 2017; Dizon-Ross, 2020; Ryan et al., 2017). If a school received a low rating from the accountability system based on poor student achievement scores, increased pressures from reform practices meant to improve achievement could result in additional teacher stress and turnover. Some researchers suggested the role a campus principal plays in supporting teachers, in general, and how positive relationships with the campus principal could improve teacher perceptions on a campus (Weddle et al., 2021). However, principals are also negatively impacted by accountability systems adding stress to the support network for teachers (Mitani, 2018). Accountability systems do have an impact on teacher turnover, but what is not clear is the extent of impact an accountability system can have on teacher turnover depending on the variables observed in the research (Dizon-Ross, 2020; Wronowski, 2021).

### **Student Achievement in Mathematics and Teacher Turnover**

Teacher turnover has significant, negative effects on student learning (Weddle et al., 2021), which researchers measured, in part, through student performance on standardized achievement assessments. Not all studies relate student achievement and teacher turnover to student performance on math assessments, but researchers suggested a negative impact on student achievement in math due to teacher turnover (Tang et al., 2021). Each study may differ in content between states and countries depending on the adopted assessment and curriculum standards, but an overall theme presented in the literature is that student achievement scores suffer from teacher turnover (Sorensen & Ladd, 2020). For example, Kotok and Knight (2022) utilized data from the Trends in Mathematics and Science 2015 (TIMSS) to study eighth-grade students across 27 different countries. Nguyen and Kremer (2022) studied teacher attrition using

the Schools and Staffing Survey (SASS) and the Teacher Follow-Up Survey (TFS) in which turnover rates spanned almost a decade. Student achievement on standardized assessments, specifically in math, is viewed as a measure of school quality, which results in an added emphasis on improving curriculum and instruction in this area (Wronowski, 2021). The added emphasis leads to reform measures intended to improve student achievement, which could negatively impact teacher turnover.

In Texas, the TEA measures student academic achievement in third, fourth, and fifth grades in mathematics and reading language arts using the STAAR. The TEA established criteria for the assessed curriculum in grades three through five which included individual learning standards from each grade level. The standards are further divided into two categories as “readiness standards” or “supporting standards.” “Readiness standards” make up 55-75% of the mathematics STAAR while “supporting standards” make up 30-45% of the mathematics STAAR (TEA, 2024d). All standards were separated into one of four categories, which are (a) numerical representations and relationship, (b) computations and algebraic relationships, (c) geometry and measurement, and (d) data analysis and personal financial literacy (TEA, 2024d).

Specifically, on the STAAR in the subject area of mathematics, Tang et al. (2021) concluded, in a study on student performance in both elementary and middle school years, that high rates of teacher turnover negatively impacted student outcomes, which caused unpredictability and instability in the learning environment. Tang et al. (2021) identified teacher turnover, among other student and campus variables, as factors that negatively impacted student achievement scores. Sorenson and Ladd (2020) studied the effects of teacher turnover on student achievement using a 3-year average of teacher turnover rates. Their study indicated stronger, negative effects on student achievement specifically in math than in other subjects like language

arts. Although researchers had access to student performance data in other content areas of the STAAR, such as language arts, student performance in math is viewed as a predictor of overall academic performance (Zilanawala et al., 2018).

### **School Ratings and Teacher Turnover**

For this study, campus ratings in Texas, awarded by the TEA, to better understand the effect on teacher turnover (TEA, 2022a) were used. Campuses are rated in three separate domains, which are (a) student achievement, (b) school progress, and (c) closing the gaps (TEA, 2022a). The student achievement domain “evaluates performance across all subjects for all students, on both general and alternate assessments; College, Career, and Military Readiness (CCMR) indicators; and graduation rates” (TEA, 2022a, p. 3). The TEA (2022a) defined the school progress domain as outcome measurements “in two areas: the number of students that grew at least one year academically (or are on track) as measured by STAAR results and the achievement of all students relative to districts or campuses with similar economically disadvantaged percentages” (p. 3). Lastly, the closing the gaps domain included disaggregated data of racial/ethnic groups of students and socioeconomic backgrounds of students to illustrate the achievement differences between groups (TEA, 2022a).

The final overall campus rating was a combination of the three domains which resulted in a numerical score that was then converted to a letter grade or categorical grades (TEA, 2022a). Letter grades (rating labels) are awarded as A, B, or C and the categorical grades are: Not Rated, Not Rated: Senate Bill 1365, Not Rated: Data Under Review, Not Rated: Data Integrity Issues, or Not Rated: Annexation. Each individual campus received an overall rating. Furthermore, the combination of a district’s campus ratings are converted to a district overall rating.

Researchers studying teacher turnover and school accountability systems suggested a negative impact on teacher turnover (Clotfelter et al., 2004; Gjefsen & Gunnes, 2020; Ryan et al., 2017; Wronowski, 2021). This negative impact, in part, from increased educator stress from accountability programs, which influenced decisions to leave the profession, was observed (Ryan et al., 2017). For example, Gjefsen and Gunnes (2020) studied the introduction of a new accountability system and suggested the implementation of the new system resulted in a spike in teacher turnover when initially put in place. They further explained the teacher turnover rate eventually decreased to levels observed in previous years, but still remained higher than in years prior to the implementation of the accountability system (Gjefsen & Gunnes, 2020).

The literature reviewed and presented does not necessarily focus on the type of accountability system or the differences in observed accountability systems, but rather, it highlights the overall negative impact accountability systems and the subsequent ratings had on teacher turnover. For example, in their study on school accountability labels, Swars et al. (2009) found schools labeled as lower performing had higher teacher turnover rates. More specifically, as schools received lower ratings based on student performance their teacher turnover rates increased. Furthermore, Clotfelter et al. (2004) explored the impact of accountability labels on teacher turnover rates and the helpfulness of the label. Once a lower performing school received a negative school rating, turnover rates increased from both experienced teachers and new teachers (Clotfelter et al., 2004).

Although through the part of the literature, it is clearly explained about the negative impact of accountability systems, specifically through teacher perceptions and dissatisfaction, other areas of the literature remain unclear on the manner in which they contribute to the dissatisfaction and resulting teacher turnover (Erichsen & Reynolds, 2020). The presence of an



accountability system itself may not be the contributing factor to teacher turnover as much as the specific policies implemented on the campus resulting from the accountability system once it is in place. For example, if a low or negative rating is determined for a campus from an accountability system, reform policies designed to increase student achievement could be implemented on the low performing campus. The effect of the reform policies could contribute to teacher dissatisfaction and turnover (Erichsen & Reynolds, 2020).

Another study to consider regarding the impact of school ratings on teacher turnover is through the Feng et al. (2018) research, which studied the accountability ratings in Florida public schools. It was concluded that campuses who received the lowest letter grade for school performance had the highest rates of teacher turnover when compared to campuses with better accountability ratings (Feng et al., 2018). It is important to note the timeframe in which the study occurred. The timeframe occurred when the state of Florida adjusted the parameters in which schools would be rated based on student achievement scores. TEA is currently undergoing a change in school accountability measures that is similar to the changes in Florida within the Feng et al. (2018) study. For example, schools previously needed to achieve a raw score of 60 to receive an A rating in the college, career, and military readiness domain. For the 2023 school year, schools must meet a raw score of 88 to receive an A rating in this domain.

In contrast, in a study of teachers in the New York City Department of Education (NYCDOE), Dizon-Ross (2020) suggested that accountability measures could reduce teacher turnover long term once reform practices were in place. They explained that resources infused into low performing schools and principal actions to attract and retain teachers increased job desirability, which reduced the teacher turnover rates over time (Dizon-Ross, 2020). The focal point in this section is not how or in what ways accountability systems may affect teacher

turnover long term but that accountability systems do impact teacher turnover in schools. The long term impact of accountability systems on teacher turnover can be predicated on many variables such as resources, school leadership, and policy.

### **SES, Race/Ethnicity, Student Achievement, and Teacher Turnover**

Gustafsson et. al (2018) defined SES as one's position in wealth, power, or social status related to a hierarchy. A more specific focus on SES is the category of economically disadvantaged. In alignment with the Texas Education Code (2021), school districts define ED status as students who are "eligible to participate in the national free or reduced-price lunch program" (p. 1).

Specific campus demographics, such as higher numbers of students in low SES, can contribute to teacher turnover, which could widen achievement gaps for students identified in populations such as FRLP participants (Steele et al., 2015). This is important when evaluating the relationship of student achievement and teacher turnover in schools with high percentages of students qualifying as ED. Furthermore, in a study of California and Oregon public schools, Domina et al. (2018) suggested that non-White student families enrolled in FRLP at much higher rates than White student families. This does not mean that all non-White families were ED or that all non-White students accessed the FRLP; however, campuses serving predominant non-White student populations also serve high ED student populations. Specifically, Zilanawala et al. (2018) suggested that the concentration of poverty and minority among Black students created challenging learning environments in school.

Steele et al. (2015) explained that students in schools with the highest quartile of minority, non-White populations had access to teachers with less experience, fewer advanced degrees, and lower value-added measures. Although teacher turnover was high in schools with

predominant non-White student populations, there was not evidence to support these schools lost the highest quality teachers year after year. Instead, a continual pattern of teacher turnover in the novice teaching staff contributed to reduced student performance because the newly hired teachers did not have high-value added measures (Steele et al., 2015).

Lower performing schools are observed supporting predominantly non-White student populations who are categorized as economically disadvantaged with teachers who have little teaching experience (Blizard, 2021b). Campuses that have a majority of novice teachers may not have the benefit of strong institutional knowledge, curriculum expertise, or mentoring programs, which reduce effectiveness and collegiality resulting in further turnover (Blizard, 2021b). This presents a problem for consideration on how to retain teachers who are positioned at high needs campuses.

### **School Leadership and Teacher Turnover**

In the literature, there are many studies that highlight the relationship on the impact of leadership on student achievement and teacher turnover. In regards to the relationship between school leadership and student achievement, Kraft et al. (2016) suggested that a school's culture and teacher practices likely mediate student achievement. A school's culture, developed in part by a principal or leadership team, could affect both teacher turnover and student achievement. Campus cultures that have a clear, established vision from leadership, high-quality professional development, time for collaboration, and clear communication on school issues are desirable to campuses in which to work (Kraft et al., 2016).

Similarly to the study regarding teacher turnover and student characteristics like ED percentage of a campus, principal turnover rates and their leadership practices may differ depending on other variables, such as years of experience, a school's socioeconomic status, and

student performance (Mitani, 2018). Researchers have previously suggested implications for teachers and students in response to low achievement scores or policy but have not studied the implications for principals as deeply (Mitani, 2018). Suggestions made by Mitani (2018) to improve student achievement and reduce principal turnover include performance incentives to reduce job stress and additional professional support to principals of low performing schools.

Teacher grade level reassignments are an additional factor of teacher turnover controlled, in part, by campus leadership. Atteberry et al. (2017) suggested that teacher placement through grade level reassignment may also influence student achievement. Grade level reassignments could be forced based on principal decisions, grade level size, or could be voluntary. A teacher who is moved from one grade to another may experience lower student achievement due to their lack of knowledge of the curriculum rather than a deficiency in instructional practices. Although teacher grade switching or moving within a campus may negatively affect student achievement, Brummet et al. (2017) acknowledged that determining if the move is teacher-induced or principal-induced could be difficult. Acknowledging these grade switching practices by school leadership remains important as the decision-making itself could influence student achievement and teacher turnover.

Kraft et al. (2016) suggested that improvements in school leadership and professional development for teachers had the strongest relationship with decreased teacher turnover. Researchers observed that even the teacher's perception of the principal's leadership style influenced teacher turnover (Weddle et al., 2021). For example, Weddle et al. (2021) suggested teachers perceived campus and district administrators to value student achievement scores above any other measures related to student learning. The difference in perceptions between teachers

and administrators contributed to an increase in teacher stress from accountability pressures which are linked to student performance on the standardized assessments.

Although not specifically addressed in this study, principal actions, such as implementation of professional development, mentorship programs, and leadership style may play a role in teacher turnover. In order to promote student and school achievement, Mitani (2018) suggested the leadership talents of a principal be allocated in alignment with school needs. One example would be considering principal experience or principal performance reviews in relation to schools with similar student characteristics. Effective matching between principal and campus needs could support stronger, positive outcomes if principal placement was based on need and district administrators dismissed ineffective principals (Mitani, 2018). Further research is necessary to determine the principal's characteristics and the association with student achievement and teacher turnover.

### **Educational Theory**

The perspective of contemporary educational (CE) theory by Dr. Richard Ingersoll (2001) guided this study. The CE theory addressed the central cause of insufficient school performance as the ability or inability of schools to hire classroom teachers efficiently (Ingersoll, 2001). Because the study addressed teacher turnover in both research questions, the researcher hypothesized that teacher turnover impacts school performance of students and, consequently, the school rating. This perspective gives insight to better understand the additional pressures on schools regarding student achievement from teacher turnover. This study highlights that teacher turnover occurs not because of a lack of availability of qualified teachers but because excessive turnover itself causes added demand on the supply of available teachers. The researcher used this

approach to empirically focus on determining the effects of teacher turnover on student achievement as opposed to understanding why teacher turnover may or may not occur.

Additionally, in order to further understand the CE theory, researchers used teacher job satisfaction, through the use of the SASS and the TFS to better understand behavioral factors contributing to teacher turnover (Brummet et al., 2017; Erichsen & Reynolds, 2020; Kraft et al., 2016). For example, Kraft et al. (2016) suggested that the organizational contexts of schools affect both teachers and students in motivation and job satisfaction. The result of these effects could have differing implications for teachers and students. Although the literature explored teacher intentions to leave the profession through job satisfaction surveys, teacher intentions are not always aligned with actual behaviors (Weddle et al., 2021). Furthermore, Erichsen and Reynolds (2020) built upon collective pedagogical teacher culture (CPTC) theory, suggesting that teachers who work in schools with low student achievement would be less negatively impacted by working in collaborative environments than in environments with little to no collaboration.

Hence, both the CE theory and the CPTC theory remain the best foundational theories for this study since the research questions focus on student math achievement in grades three through five, student turnover, and campus rating. Specifically, the CE theory study observes the issues among the relationship between low student performance or low school rating and teacher turnover. Furthermore, teachers who feel secure, have positive job satisfaction on their campuses, no matter the rating, and who have opportunities to collaborate and grow with their colleagues prove more likely to stay on a campus. Even though this study did not focus on teacher effectiveness or satisfaction, understanding that a teacher with a positive job satisfaction

will be more inclined to stay on a campus, despite school rating, is necessary to interpret the results of this study.

### **Summary**

This literature review included studies related to the impact of teacher turnover on student math achievement in grades three through five, SES, and school ratings, specifically in the state of Texas. The central themes discussed in this literature review include (a) student achievement and teacher turnover, (b) school ratings and teacher turnover, (c) SES, student achievement, and teacher turnover, and (d) school leadership and teacher turnover. These themes align with the research questions to determine the relationship, if any, that teacher turnover has on math achievement among third-, fourth-, and fifth-grade students and how the school rating and the economically disadvantaged status predict teacher attrition rate among Texas elementary schools.

Teacher turnover possesses significant, negative effects on student learning, which researchers measure through student achievement scores on standardized assessments (Weddle et al., 2021) and associate with the quality of a school (Wronowski, 2021). The scores from student achievement assessments impact school ratings, specifically in the state of Texas. Research on teacher turnover and poor school accountability systems suggests a negative impact on teacher turnover (Clotfelter et al., 2004; Dizon-Ross, 2020). What remains unclear is if the accountability system itself negatively impacts teacher turnover or if the subsequent outcomes from negative school ratings negatively impact teacher turnover. In their research on public school accountability, workplace culture, and teacher morale as viewed through CPTC theory, Erichsen and Reynolds (2020) suggested that outcomes of negative school ratings could lead to increased job stress and teacher turnover. When combined with the CE theory, the results of poor

student performance on achievement assessments and low school ratings could lead to teacher job dissatisfaction and increased levels of teacher turnover. Lastly, although not specifically addressed in this study, the literature recognized the relationship of teacher job satisfaction and teacher turnover (Brummet et al., 2017; Erichsen & Reynolds, 2020; Kraft et al., 2016). The next chapter will focus on the methodology, analysis, design, participants, and analysis.



CHAPTER III  
METHODOLOGY

**Introduction**

The purpose of this study is to further investigate the effects of teacher turnover and student achievement in order to more specifically understand the impacts of teacher turnover in math, grades three through five within the state of Texas. Previous research focused on the impact teacher turnover had on student achievement (Blizard, 2021a; Tang et al., 2021), but previous research did not focus on multiple, sequential grade levels in the same school year. Although this study builds on the same intent of previous research, it uses different analytical models to represent the relationship of teacher turnover and student achievement, including school rating. The research questions that guided this study and methodology include:

RQ1: How does teacher turnover predict math achievement in third, fourth, and fifth grade students?

RQ2: How does the school rating and the economically disadvantaged status predict teacher attrition rate among Texas elementary schools?

This study used a quantitative approach from retrospective, publicly available data in the state of Texas. Various data collection methods and analyses studying the effects of teacher turnover on student achievement were conducted (Kotok & Knight, 2022; Tang et al., 2021; Wronowski, 2021). Previous research used quantitative approaches, which included job satisfaction surveys (Brummet et al., 2017; Erichsen & Reynolds, 2020; Kraft et al., 2016), but the emphasis in those studies intended to identify, in part, factors related to teacher turnover. Because the purpose of this study is to better understand the impact on student achievement from teacher turnover, a quantitative method was most appropriate to use with empirical data sets.

This study specifically used a cross-sectional analysis of the three elementary years assessed in third, fourth, and fifth grades on the mathematics portion of the STAAR during the 2021-2022 school year.

An application for Institutional Review Board (IRB) approval was submitted for this study, but the review was not required because it used de-identified and publicly available data. Data used in the study on teacher turnover and student achievement were not identifiable and only included statistical information on turnover rates at the district level as well as campus ED percentages and student performance percentages on the STAAR mathematics assessment in grades three through five. Analytical software called SPSS was used to aid in the analysis of data in this study.

### **Methodology, Design, and Analysis**

The quantitative methodology and retrospective design used in this study are modeled, in part, from Blizard (2021a) and Tang et al. (2021) who focused on the impact of teacher variables, including turnover, on student performance. Kraft et al. (2016) analyzed similar variables, such as school organizational contexts, teacher turnover, and student achievement through a principal component analysis because of the type of data collected on teacher perceptions and organizational structure. Because this study used teacher perception data not obtained in teacher turnover studies, this analysis was not appropriate for the study. Tang et al. (2021) studied similar variables using a growth hierarchical model to observe changes over time on the STAAR. Additionally, correlations and a multiple regression with descriptive statistics to better understand the variables within a single school year were used. Blizard (2021a) used a logistic regression due to the categorical nature of variables related to proficiency outcomes instead of continuous variables used in this study. The intent of the study by Blizard (2021a)

focused on student outcomes based on teacher turnover, which were directly related to the research questions in this study.

The sample used in this study included traditional public, non-charter elementary schools in the state of Texas serving grades early elementary through five, pre-kindergarten through five, and kindergarten through five. Through this study, correlations to answer the first research question related to teacher turnover predicting math achievement in third-, fourth-, and fifth-grade students on the STAAR was found. The multiple regression was used as opposed to a growth hierarchical model or logistic regression because the variables used were taken from one specific year and were continuous variables measured using scale scores and percent forms of performance on the STAAR.

### **Data and Participants**

The study included elementary campuses in the state of Texas who served early elementary through fifth grade, pre-kindergarten through fifth grade, and kindergarten through fifth grade. De-identified information publicly available online or through a PIR to the TEA was applied. Because the data sets obtained were de-identified and publicly available, the IRB did not require approval. From the data obtained through the TEA, a total of 2,838 campuses were included in the sample. Each campus in the study had a unique identification number which allowed the variables of student performance on STAAR, ED status, and overall score to be associated directly with each campus.

The TEA divides the state into 20 different regions or education service centers (TEA, 2024b), which it then further subdivides into districts and campuses. Every region within the state contained campuses represented within the study. Table 1 displays the number of campuses represented within each region across the state, which ranged from 571 campuses in Region 4 to

22 campuses in Region 8. The campuses within the study were not chosen based on their region.

It is important to know the number of campuses/regions was related to population density.

Regions with a higher representation of campuses could have greater influence with reported teacher turnover values than regions with lower campus representation.

**Table 1**

*Campus Distribution by Region*

Region	Campuses
1 - Edinburg	296
2 - Corpus Christi	57
3 - Victoria	31
4 - Houston	571
5 - Beaumont	33
6 - Huntsville	38
7 - Kilgore	66
8 - Mount Pleasant	22
9 - Wichita Falls	28
10 - Richardson	466
11 - Fort Worth	295
12 - Waco	90
13 - Austin	253
14 - Abilene	26
15 - San Angelo	34
16 - Amarillo	57
17 - Lubbock	57
18 - Midland	25
19 - El Paso	96
20 - San Antonio	297

Another characteristic of the campuses within the sample is the number of students served. This is another component not specifically addressed within this study but necessary to

highlight in order to portray the variance and diversity of campus size within the sample. The smallest campus within the sample reported serving 38 students while the largest campus within the sample reported serving 2,979 students. Although a significant variance in the number of students served existed within the sample, the study did not exclude campuses from the sample based on their sizes. The ED status of campuses within the data set ranged from 1.3% to 100%. In the 2021-2022 school year, 45.83% of all public school students in Texas were eligible for either free or reduced price meals.

Table 2 represents STAAR mathematics scores in grades three through five over the previous 5 years, excluding 2019-2020 because the assessment was not given that year due to COVID-19. The table includes all students in public schools in Texas who took the assessment, including traditional public schools and charter schools. The purpose of including Table 2 is to demonstrate the changes in the STAAR scores over time as they relate to the student assessments scores used in this study.

**Table 2***Historical STAAR Mathematics Data by Performance Category by Grade*

Third Grade	Did Not Meet	Approaches and Above	Meets and Above	Masters
2021-2022	29	71	43	21
2020-2021	38	62	31	14
2018-2019	21	79	49	25
2017-2018	22	78	47	23
2016-2017	23	77	49	26
Fourth Grade	Did Not Meet	Approaches and Above	Meets and Above	Masters
2021-2022	30	70	43	23
2020-2021	41	59	36	21
2018-2019	25	75	48	28
2017-2018	22	78	49	27
2016-2017	24	76	47	27
Fifth Grade	Did Not Meet	Approaches and Above	Meets and Above	Masters
2021-2022	23	77	48	25
2020-2021	30	70	44	25
2018-2019	10	90	58	36
2017-2018	9	91	51	39
2016-2017	13	87	50	24

*Note.* Values are represented in percent form. STAAR was not administered

in the 2019-2020 school year due to COVID-19 school closures.

**Instrumentation and Data Collection**

The focus for this research was on the effects of teacher turnover on student performance in math in grades three through five within public schools throughout the state of Texas. The TEA is the governing organization responsible for the oversight of elementary and secondary education, which encompasses the public schools in Texas (TEA, 2024c). Data

used in the research were publicly available through the TEA, including web pages operated by the TEA, a PIR to the TEA, and other online platforms operated by the TEA. Although all of the necessary information was publicly available, it required three specific data sets to conduct the research, which were (a) a list of all public schools including their accountability ratings for the 2021-2022 school year, (b) district teacher turnover ratios, and (c) campus student achievement scores in mathematics on the STAAR for grades three through five by campus. After retrieving the data sets separately, the study combined individual campus data using unique, predetermined campus identification numbers provided by the TEA.

Information was combined using the unique campus and district identification numbers, which were assigned by the TEA into SPSS. Assumptions of normality were checked using various graphical representations (e.g. box plots, Q-Q plots, and P-P plots) and extreme outliers were removed from the data set. Skewness and kurtosis were also analyzed for each variable to determine if assumptions were violated preventing an accurate analysis of the data. This data cleaning process was completed within SPSS, analytical software, under the guidance of statisticians in the Center for Research Design and Analysis at Texas Woman's University.

#### ***Accountability Ratings for the 2021-2022 School Year***

The first data set retrieved included all public charter or non-charter schools in Texas in the 2021-2022 school year. This was the starting point of the data collection because it was gathered and verified by the TEA and allowed all potential schools to be identified for the 2021-2022 school year at once. All schools within the data set had unique campus identification numbers assigned to them, which proved necessary to later match student achievement scores by campus. Because this data set included all public schools under the TEA's supervision,

exclusionary criteria were applied to align with the research questions (i.e., middle and high schools, charter schools, enrollment type, and alternative education campuses).

In addition to campus identification numbers, two more variables provided in this specific data set used in the analysis and aligned to the research questions included the campus overall score, connected to each campus' accountability rating and the ED percentage of students on the campus. Each campus reports ED percentages to the TEA annually. The campus overall score is computed, in part, based on the performance of student achievement on STAAR (TEA, 2022a). More specifically, the campus overall score is based on a formula, which combines two of three measured areas of student performance on STAAR. The first two measured categories include student achievement and school progress. The better of the two scores is used and weighted at 70% in the formula. The third category, closing the gaps, is added and weighted at 30% in the formula. Combining the two produces a numerical value, which then the TEA converts into a letter grade. Although the letter grades were available for the overall campus score for each school, the study included the numerical values for specificity.

### **Campus Enrollment Type and Grade Levels Served**

The study identified and removed campuses based on exclusionary criteria of enrollment type. This is not related to grade levels but rather how schools enroll students through applications, special program participation, or transfers. Additionally, the study included identification of charter or non-charter schools as a variable in the accountability ratings data set and listed it under the "Campus Enrollment Type" variable. The TEA (2024a) classifies enrollment type of schools into seven categories: Open Enrollment Charter School, Selective Enrollment School (Criteria-Based), Selective Enrollment School (Special Program-Based), Zoned School (no transfers accepted), Zoned School (transfers accepted), Combined Enrollment



Type School, and Special Assignment School. The study categorized schools as either Zoned School (no transfers accepted or transfers accepted) or Combined Enrollment Type School. The TEA (2024a) describes Combined Enrollment Type Schools as those with two or more enrollment types.

Both research questions in the study specifically addressed grade levels in elementary schools. The study applied additional restrictions to only include schools serving grades early elementary through five, pre-kindergarten through five, or kindergarten through five. Campuses could not strictly be sorted by the School Type variable. Because some campuses served a combination of elementary and secondary grades, primary grade levels, or upper elementary grade levels, it was impossible to strictly sort campuses by school type for this study. Campuses strictly identified as alternative education campuses also became part of the exclusionary criteria; however, after applying the enrollment and grades served restrictions, no alternative education campuses remained within the sample. The resulting sample of schools used in the research totaled 2,838.

### ***District Teacher Turnover***

For this study, the TEA definition of teacher turnover, classroom teachers employed the preceding school year but no longer employed at the start of the new school year (TEA, 2023) was used. More specifically, this study used values of teachers employed in the 2020-2021 school year but not employed in the 2021-2022 school year. The TEA uses the Public Education Information Management System (PEIMS) as the line of communication between schools. One set of data used within PEIMS includes campus staffing information reported by school districts to the TEA. In Texas, the district actually employs public school teachers and not the specific

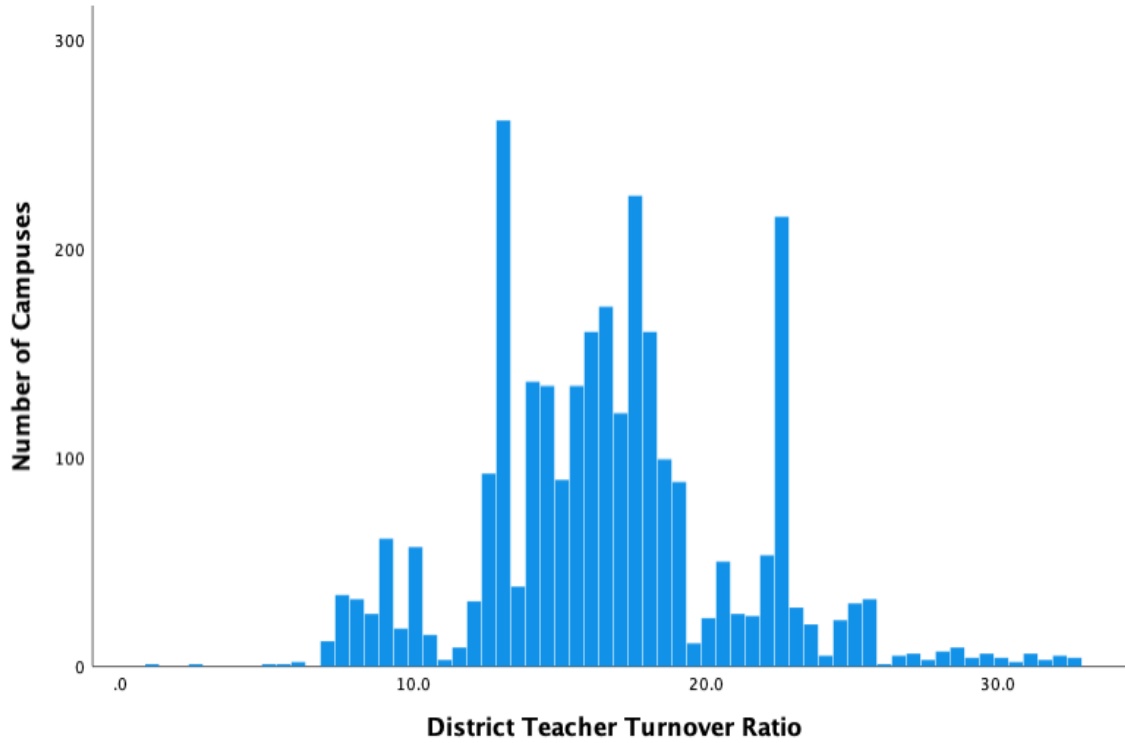
campus they serve. Therefore, this available data created difficulty with associating specific campus turnover rates with specific student performance measures.

School districts report staff information to TEA from the district level, not necessarily the unique campus level. Because of this reporting practice, public information on teacher turnover was only available at the district level. A PIR was submitted to TEA for teacher turnover values at the campus level; however, due to PEIMS coding of employees and reporting measures, PEIMS made only district level turnover rates available. The TEA provided teacher turnover values through the PIR separated by district, which included a unique district identification number. The study matched each district identification number to each campus within the respective district. The result of the matching caused all campuses within a district to have the same teacher turnover ratio. This means that a campus could have multiple elementary schools and have the same exact teacher turnover ratio as another campus.

Figure 2 represents the district teacher turnover values provided in the PIR by the TEA, which includes a total of 2,815 campuses. The TEA (2023) established a teacher turnover attrition sum, represented in percent form, by calculating the number of teachers employed in the previous school year and not in the current school year. The minimum teacher turnover included for this study was 1.1% and the maximum was 32.5%. In the 2021-2022 school year, statewide teacher turnover in Texas was 11.57% (TEA, 2023). This number includes all teachers employed in public schools, not specifically elementary schools.

**Figure 2**

*Cases of District Teacher Turnover*



*Student Achievement Scores in Mathematics*

The last data set needed from the TEA included student achievement scores in mathematics on the STAAR for the 2022 school year. A secondary PIR was submitted to the TEA for all STAAR mathematics scores in grades three through five for 2022 by performance category, including the scale score by grade level. The TEA responded that no such data set existed within its scope of research and that the scores in this manner were only accessible by individual campuses through their research portal. The TEA has a division devoted to the assessment and data of the STAAR as part of its organizational structure. This TEA division makes a research portal available to the public to analyze assessment data by school year and by

subject. The study used the following information retrieved from the portal for each of the grades three through five to identify the data below:

- average scale score in mathematics;
- percent of students who scored in the Did Not Meet performance category;
- percent of students who scored in the Approaches and Above performance category;
- percent of students who scored in the Meets and Above performance category;
- percent of students who scored in the Masters performance category. (TEA, 2022a, p. 25)

The TEA for the purpose of the STARR establishes the four performance categories mentioned above, which can be found in an accountability manual available online (TEA, 2022a). For this study, these five data points were used to answer the first research question. This included data from the research portal downloaded individually for each campus and combined with the campus demographics, school ratings, and teacher turnover ratios from the other two data sets using the unique campus identification number. The TEA, not the researcher, previously assigned the unique campus identification number.

### **Reliability of Data**

For this study, data collected and used were provided by the TEA from standardized assessment scores on the mathematics STAAR in grades three through five and reported teacher turnover rates and ED percentages of a campus from the PEIMS. The TEA assessed reliability and validity measures of the STAAR internally and offered limited information, publicly available, as to how they determine the reliability and validity of the assessments and what the results indicate from their findings. The TEA (2022b) explained that “reliability estimation methods that require only one test administration have been developed and are

commonly used for large-scale assessments” (pp. 3-6). No additional information regarding the reliability or validity is available.

### **Limitations**

A significant limitation of this study involves the teacher turnover data. Teacher attrition data available through the TEA and used in this study is reported annually from the district level to the TEA. When districts report data on teacher employment to the TEA, the teachers are considered employees of the district and not of an individual campus. Because of this reporting process, all campuses within the district had the same teacher turnover values and not an individual, unique campus teacher turnover value. Without this distinction between campuses, it is difficult to determine the effect, if any, of individual campus teacher turnover on student achievement scores. As a result, a campus with low student achievement scores and a campus with high achievement scores within the data used in the research had both the same teacher turnover ratio as provided by the TEA.

Additionally, the researcher is a current elementary school principal. The researcher’s professional knowledge of student learning and hiring needs is of interest to the field of education. Because the researcher is active in the career field of the study, biases could be present. Data used and collected by the researcher were provided by a third party government agency and outcomes were used to inform professional practice across the industry. Data used by the researcher were not schools that the researcher was exclusively affiliated with.

Another limitation of this study involves the timing, nature of assessment, and format of the STAAR. The STAAR assessment is given once per year in grades three through five in the spring semester (TEA, 2022a). The TEA uses the STAAR as a standalone measure to determine student achievement because it is required and delivered by all public schools in

Texas. Other methods of determining student achievement could be used, but the STAAR is a universal assessment in Texas public schools. Districts and campuses may have other local forms of assessment to measure student achievement, but they would not be universal to all public elementary schools.

Although the TEA requires STAAR, it is only used once per school year as a cumulative assessment, and, therefore, researchers cannot use STAAR to determine growth within the school year. House Bill 3261, enacted by the 87th Texas Legislature in 2021, required districts to give online state assessments mandated by the TEA in 2022-2023, which the TEA did not mandate in prior years. When data was collected for this research, in the 2021-2022 school year, campuses had the option to use an online version, paper version, or combination of both to deliver the assessments to students. The TEA research portal included no distinction on the format used by the campus. Researchers cannot use this scope of data to determine the effect of testing format on student results.

Lastly, campus location type (e.g. rural, urban, suburban) and student demographic variables other than ED status was not considered for this study; however, in the literature, researchers observe campus location type to have an effect on teacher turnover (Ronfeldt et al., 2013; Sorensen & Ladd, 2020). Additionally, demographic information such as race and ethnicity are available at the campus level by percentage of the student body, but it was not analyzed in this study. Higher rates of less effective teachers may be present in schools located in urban areas serving predominantly minority populations (Adnot et al., 2017; Brummet et al., 2017). The impact of student race and ethnicity or campus location could not be determined in this study.

## Summary

Previous research used quantitative methods to model and analyze the impact of teacher turnover on student achievement (Blizard, 2021a; Kraft et al., 2016; Tang et al., 2021). Those methods included growth hierarchical linear models, logistic regressions, and principal component analysis. This study used cross-sectional data of student math achievement scores in grades three through five on the STAAR in the state of Texas during the 2021-2022 school year. It also used data on teacher turnover and school rating scores from the TEA for the 2021-2022 school year. The TEA websites published this data through PIRs. This study analyzed data from 2,838 elementary campuses serving early elementary through fifth-grades, pre-kindergarten through fifth-grades, and kindergarten through fifth-grades. The campuses in the study were representative of all 20 subdivided learning regions across the state of Texas, which also represent differing levels of population densities and school sizes.

## CHAPTER IV

### RESULTS

#### **Introduction**

The purpose of this study was to examine the relationship between teacher turnover and student achievement in elementary mathematics in grades three through five based on standardized test scores. The study also sought to understand the relationship between a campus's ED percentage and overall score on teacher turnover. Data from student achievement scores in third, fourth and fifth grades on the STAAR in mathematics for the 2021-2022 school year were obtained from the TEA in five separate components for each grade level. The first component used was the scale score which is reported in distinct ranges for each grade level tested. The other four variables used were performance categories of "did not meet," "approaches and above," "meets and above," and "masters," which are all reported in percent form by campus. The cases in this study totaled to 2,838. Data on teacher turnover ratios for each campus in the study was requested from the TEA through a PIR; however, the TEA only made available district-level teacher turnover data, which does not include a unique value to each specific campus. This means that multiple campuses were linked with the same teacher turnover data. In addition to teacher turnover, data on campus specific turnover, overall performance scores, and ED percentage was obtained for each specific campus.

All variables used in this study were treated as continuous, assuming a linear relationship which is necessary in correlative analysis (Schober et al., 2018; Verhulst & Neale, 2021), and normality assumptions were verified by interpreting skewness and kurtosis values. In some instances, extreme outliers were identified and those cases were removed. The variables of teacher turnover, overall campus score, and the masters performance category in grades three,



four and five all contained outlier cases, which were removed. Table 3 represents the variables that had extreme outliers and how many total cases remained within the analysis after the outliers were removed. Interestingly, the only extreme outliers observed in performance categories on the STAAR were in the “masters” level. Because teacher turnover was associated with multiple campuses within the district, it was expected that if an outlier were to occur it would affect a large number of campuses.

**Table 3**

*Variables With Extreme Outliers*

	Cases					
	Included		Outliers Removed		Total from Sample	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Teacher Turnover	2815	99.19	23	0.81	2838	100.00
Masters in 3rd	2836	99.93	2	0.07	2838	100.00
Masters in 4th	2834	99.86	4	0.14	2838	100.00
Masters in 5th	2836	99.93	2	0.07	2838	100.00
Overall Campus Score	2835	99.89	3	0.11	2838	100.00

**Research Question 1**

*How does teacher turnover predict math achievement in third, fourth, and fifth grade students?*

In order to answer the first research question, Pearson’s product-moment correlations were conducted to examine the relationship between teacher turnover and student achievement scores in grades three, four, and five from the STAAR mathematics assessment. This study used the Pearson product-moment correlation in conjunction with the scale score from the math STAAR and each of the four performance categories measured on the STAAR math in grades three through five. The analysis was run separately by grade level to better determine the

relationship, if any, between teacher turnover and student achievement. Table 4 represents grade level performance data separated by scale score and performance categories on the STAAR mathematics assessment for the 2021-2022 school year. The number of schools in the sample totaled to 2,838; however, the study excluded extreme outliers in the “masters” performance category for each grade-level. In Table 4, the study excluded two cases from the Third Grade “masters” performance category due to extreme outliers resulting in a total of 2,836 cases.

**Table 4**

*STAAR Data by Performance Category by Grade*

Third Grade	<i>N</i>	Min.	Max.	<i>M</i>	<i>SD</i>
Scale Score	2838	1258	1691	1432.76	65.68
Did Not Meet	2838	0	88	31.30	15.53
Approaches and Above	2838	12	100	68.71	15.53
Meets and Above	2838	0	94	39.89	17.32
Masters <sup>a</sup>	2836	0	74	19.10	12.72
Fourth Grade	<i>N</i>	Min.	Max.	<i>M</i>	<i>SD</i>
Scale Score	2838	1348	1816	1539.75	65.11
Did Not Meet	2838	0	96	32.46	16.14
Approaches and Above	2838	4	100	67.55	16.14
Meets and Above	2838	0	98	39.79	17.79
Masters <sup>a</sup>	2834	0	79	21.12	13.84
Fifth Grade	<i>N</i>	Min.	Max.	<i>M</i>	<i>SD</i>
Scale Score	2838	1423	1861	1610.23	65.11
Did Not Meet	2838	0	79	24.34	14.25
Approaches and Above	2838	12	100	68.71	15.53
Meets and Above	2838	0	98	45.98	18.22
Masters <sup>a</sup>	2836	0	83	23.45	14.70

*Note.* <sup>a</sup>The study excluded extreme outliers from the Masters performance category.

Also in Table 4, the study excluded cases in fourth and fifth grade “masters” performance categories due to extreme outliers, which resulted in a total of 2,834 and 2,836, respectively. No

outliers were observed in the scale score, “did not meet,” “approaches and above,” or “meets and above” variables in any grade level.

### ***Summary of Findings for Research Question 1***

As shown in Table 5 using the Pearson’s product-moment correlations, results indicate a significant weak, negative association between teacher turnover and almost all performance category measures, including scale score. In third grade, a significant weak, negative association was observed between teacher turnover and scale score ( $r = -.19, p < .001$ ), teacher turnover and “approaches and above” ( $r = -.22, p < .001$ ), and teacher turnover and “meets and above” ( $r = -.20, p < .001$ ). The “masters” performance category displayed the weakest association with teacher turnover, although statistically significant ( $r = -.15, p < .001$ ). In fourth grade, a significant weak, negative association was observed between teacher turnover and scale score ( $r = -.19, p < .001$ ), teacher turnover and “approaches and above” ( $r = -.22, p < .001$ ), and teacher turnover and “meets and above” ( $r = -.19, p < .001$ ). The “masters” performance category, again, displayed the weakest association with teacher turnover, although still statistically significant ( $r = -.15, p < .001$ ). Similar patterns were observed in fifth grade, which included a significant weak, negative association observed between teacher turnover and scale score ( $r = -.20, p < .001$ ), teacher turnover and “approaches and above” ( $r = -.22, p < .001$ ), and teacher turnover and “meets and above” ( $r = -.22, p < .001$ ). The “masters” performance category remained the weakest statistically significant association with teacher turnover ( $r = -.17, p < .001$ ).

**Table 5***Pearson's Product-Moment Correlations Between Descriptive Variables and Teacher Turnover*

Third Grade		Scale Score	Did Not Meet	Approaches and Above	Meets and Above	Masters <sup>b</sup>
Teacher Turnover <sup>a</sup>	<i>r</i>	-.19**	.22**	-.22**	-.20**	-.15**
	<i>p</i>	<.001	<.001	<.001	<.001	<.001
	<i>N</i>	2815	2815	2815	2815	2813
Fourth Grade		Scale Score	Did Not Meet	Approaches and Above	Meets and Above	Masters <sup>b</sup>
Teacher Turnover <sup>a</sup>	<i>r</i>	-.19**	.22**	-.22**	-.19**	-.15**
	<i>p</i>	<.001	<.001	<.001	<.001	<.001
	<i>N</i>	2815	2815	2815	2815	2811
Fifth Grade		Scale Score	Did Not Meet	Approaches and Above	Meets and Above	Masters <sup>b</sup>
Teacher Turnover <sup>a</sup>	<i>r</i>	-.20**	.23**	-.22**	-.22**	-.17**
	<i>p</i>	<.001	<.001	<.001	<.001	<.001
	<i>N</i>	2815	2815	2815	2815	2813

*Note.* <sup>a</sup>The study described the Teacher Turnover variable at the district level and not campus level turnover. <sup>b</sup> The study removed extreme outliers from the Masters performance category.

\*\* $p < 0.01$ .

The only positive association observed in the Pearson's product-moment correlations included teacher turnover and the "did not meet" variable. In order to better understand the reason behind the positive association with the "did not meet" variable and negative association with the other variables, researchers need to understand the specific meanings of the variables within the STAAR reporting design. In the "did not meet" performance category, results indicate that the higher the percentage the more negative the impact on student performance. This is

different from the scale score, “approaches and above,” “meets and above,” and “masters” variables, which all would indicate higher student student performance with positive values. Thus, in Table 4 the statistically significant weak, positive association with teacher turnover and “did not meet” in third grade ( $r = .22, p < .001$ ), fourth grade ( $r = .22, p < .001$ ), and fifth grade ( $r = .23, p < .001$ ) all indicate a negative impact on student achievement.

Along with Pearson’s  $r$ -values, confidence intervals are necessary to provide context in interpretation of the results (Schober et al., 2018), which are represented in Table 6. This study used 95% confidence intervals to interpret the results. Table 6 provides results of the confidence intervals between teacher turnover and the student performance variables used in the study, including scale score, “did not meet,” “approaches and above,” “meets and above,” and “masters” on the math STAAR. Including the confidence intervals in the interpretation of results demonstrates the ranges in each grade level’s relationship of student achievement variables and teacher turnover. In every case, each Pearson’s product-moment correlation falls within the weak range using 95% confidence.

**Table 6***Confidence Intervals for Research Question 1*

Third Grade		<i>r</i>	Lower C.I.	Upper C.I.
Teacher Turnover	Scale Score	-.19	-.23	-.16
	Did Not Meet	.22	.18	.25
	Approaches and Above	-.22	-.25	-.18
	Meets and Above	-.20	-.23	-.16
	Masters	-.15	-.19	-.11
Fourth Grade		<i>r</i>	Lower C.I.	Upper C.I.
Teacher Turnover	Scale Score	-.19	-.23	-.15
	Did Not Meet	.22	.19	.26
	Approaches and Above	-.22	-.26	-.19
	Meets and Above	-.19	-.22	-.15
	Masters	-.15	-.18	-.11
Fifth Grade		<i>r</i>	Lower C.I.	Upper C.I.
Teacher Turnover	Scale Score	-.20	-.24	-.17
	Did Not Meet	.23	.20	.27
	Approaches and Above	-.22	-.26	-.19
	Meets and Above	-.22	-.25	-.18
	Masters	-.17	-.21	-.13

**Research Question 2**

*How does the school rating and the economically disadvantaged status predict teacher attrition rate among Texas elementary schools?*

The study used a multiple regression analysis to identify how the overall campus rating score and ED percentage of a campus predicted teacher turnover. Overall results indicated the model is significant at  $F(2, 2,809) = 152.56, p = < .001$  and accounted for 9.8% of the variance of district teacher turnover ratio. Based on the negative regression coefficient, a lower overall campus score was associated with higher rates of teacher turnover,  $\beta = -.31, p = < .001$ . Of the two predictors used in the multiple regression, only the overall score proved significant (see Table 7). Although other campus characteristics were available in the data which could have been added to the regression, like the percentage of students identified as emergent bilingual (EB), they were not used because they would have more greatly restricted the sample size. In previous studies, researchers observed the ED percentage of a campus to negatively affect teacher turnover, but this model did not display a relationship between the two.

**Table 7**

*Summary of Multiple Regression Analysis Predicting Teacher Turnover*

Predictor	Unstandardized		Standardized		
	b	SE	$\beta$	t	p
Overall Score	-.17	.01	-.31	-16.64	<.001
ED <sup>a</sup>	-6.87 <sup>b</sup>	.003	.00	-.02	.98

Note.  $F(2, 2,809) = 152.56, p = < .001, R^2 = .098, \text{adjusted } R^2 = .097.$  <sup>a</sup>ED

= Economically Disadvantaged -6.87 = -6.866E-5

### Summary of Results

The purpose of this study was to examine the relationship between teacher turnover and student achievement in elementary mathematics in grades three through five based on STAAR standardized test scores using results specifically from the 2021-2022 school year. The data used

in this study also included district teacher turnover rates, which included data provided from the TEA through a PIR. The study used Pearson's product-moment correlations and a multiple regression analysis to answer the research questions.

Based on the results and using Pearson's product-moment correlations to answer Research Question 1, many weak, negative associations were observed in the scale score, including "approaches and above," "meets and above," and "masters" performance categories in third, fourth, and fifth grades. These negative associations demonstrated were statistically significant. The only positive, statistically significant association observed included teacher turnover and the "did not meet" performance category, which is explained by the design of the performance category. Students in the "did not meet" category have an inverse relationship to the other performance categories. These students were observed as not meeting the standard and viewed from the assessment results in a negative context even though Pearson's  $r$ -value is positive. Using the multiple regression analysis to answer Research Question 2, the negative regression coefficient indicated an association between lower campus overall rating score and higher rates of teacher turnover.



CHAPTER V  
RECOMMENDATIONS AND CONCLUSIONS

**Introduction**

In this chapter, the interpretation of the results through analysis will be presented, which includes drawing conclusions, providing recommendations and juxtaposing previous literature to the results. The interpretation is separated by the two research questions addressed in this study, which both include the variable of teacher turnover and student achievement. Recommendations for future research in the areas of teacher turnover and student achievement will also be discussed. A discussion and interpretation of results will be highlighted along with recommendations for future research.

**Discussion**

This study used retrospective quantitative data collected from the TEA through online web sources and PIRs. The data were publicly available and de-identified. This study analyzed data from 2,838 elementary campuses serving early elementary through fifth grades, pre-kindergarten through fifth grades, and kindergarten through fifth grades. The campuses in the study were representative of all 20 subdivided learning regions across the state of Texas, which also represent differing levels of population densities and school sizes. Pearson's product-moment correlations and a multiple linear regression were used to analyze the data and answer the research questions.

Previous studies indicate the negative effects that teacher turnover has on student learning (Sorensen & Ladd, 2020; Vagi et al., 2019; Weddle et al., 2021) and this relationship is a concern for both educators and policymakers (Atteberry et al., 2017). Teacher turnover occurs for different reasons, and researchers have investigated this topic from multiple perspectives,

including, student characteristics, teacher characteristics, school and organizational contexts, and governmental policy. This study supports previous research on teacher turnover and student achievement suggesting negative effects on student performance, specifically on mathematics for grades three through five as measured through standardized assessments by the TEA. Also found was a relationship between teacher turnover and overall campus ratings from accountability systems, specifically in Texas through this study.

Researchers have pointed to the negative effects of teacher turnover on certain, specific populations of students, such as those identified as ED. The populations of students identified as ED and non-White (Loeb et al., 2005; Ronfeldt et al., 2013; Zilanawala et al., 2018) are sources of concern about equity in student achievement (Falch & Rønning, 2007). This study supports previous research of Clotfelter et al. (2004) and Gjefsen and Gunnes (2020) who suggested that lower performing schools, which were based on school ratings from accountability systems in this study, experience high teacher turnover.

Although the results of this study indicate negative effects of student achievement from teacher turnover, limitations in the data could impair the generalizability of the results. Primarily, teacher turnover information provided from the TEA through a PIR contained only district-level data and not campus-level data. This difference in data reporting drew an association between student achievement and district-level teacher turnover data instead of campus-level turnover data. Based on this data, it was not possible to investigate associations, if any, between teacher turnover and student achievement at the campus level. In addition to teacher turnover data limitations, this study did not include factors contributing to teacher turnover through areas such as job satisfaction or a teacher's intent to leave the profession. Although previous studies explored teacher intentions to leave the profession through job satisfaction surveys, their

intentions are not always aligned with actual behaviors (Weddle et al., 2021). This study could be enhanced by including such variables along with student achievement scores and overall campus ratings from accountability systems.

Teacher turnover statistics were critical to the study and although data used came directly from the TEA and not initially collected by the researcher, significant limitations exist within the teacher turnover data when studying the relationship it has, if any, on student achievement. Because of existing reporting methods, teachers are viewed as employees of a district and not a specific campus. This means that although each campus has a teacher turnover number, that value could also be associated with multiple campuses within the district and is not necessarily unique to the campus.

### **Interpretation of Results**

Research on the effects of teacher turnover and student achievement are not new or novel within the literature. An abundance of existing literature exists on factors associated with teacher turnover, including job satisfaction, and how those factors influence student achievement (Brummet et al., 2017; Erichsen & Reynolds, 2020; Kraft et al., 2016). This study set out to address the following research questions:

RQ1: How does teacher turnover predict math achievement in third, fourth, and fifth-grade students?

RQ2: How does the school rating and the economically disadvantaged status predict teacher attrition rate among Texas elementary schools?

The focus of this study was on understanding the effects, if any, of teacher turnover on student achievement in math in grades three through five on the STAAR and how the overall campus score based on school accountability systems along with the economically disadvantaged

status of a campus influenced teacher turnover in Texas. This study includes cross-sectional data from a single year of assessment results in a single subject, mathematics, which readers should take into consideration when interpreting the results. In addition, the student achievement data are specifically related to the STAAR assessment in Texas which could impact the generalizability of the study and interpretation to other student populations. Finally, the data used and analyzed in this study do not consider how students' EB status, special program participation, or specific race and ethnicity could be impacted differently by teacher turnover.

### ***Teacher Turnover and Student Achievement***

The first research question focused on the relationship between student achievement and teacher turnover. The Pearson's product-moment correlations were used in conjunction with scale scores from the math STAAR and each of the four performance categories measured on the STAAR math in grades three through five. The four performance categories established by the TEA (2022a) are: "did not meet," "approaches and above," "meets and above," and "masters." Teacher turnover rates were collected from the TEA through a PIR, and the school performance ratings were collected through a public website operated, in part, by the TEA.

Interpreting Pearson's product-moment correlations, in general, can be viewed as an association between variables (Schober et al., 2018). The correlation, which are most appropriate for continuous variables (Verhulst & Neale, 2021) were used to analyze the relationship between the variables of student achievement and teacher turnover. The results of the study indicate a weak, negative statistically significant relationship between student achievement and teacher turnover in grades three, four, and five in the "approaches and above," "meets and above," and "masters" performance categories.

This means that although student achievement scores are negatively impacted by teacher turnover, the impact is minimal in all areas. Although the impact is minimal, student performance is still negatively impacted by the teacher turnover. If students were subjected to teacher turnover year after year, it would be expected that their achievement would continually diminish on standardized assessments. If student performance scores on the standardized assessments are indicative of their learning, it is also expected that their overall learning, at least in grades three through five, would also diminish. The student performance area which is least affected is the “masters” category, which included students performing at the highest level of the assessment. This could mean that students who are high achieving on standardized tests are less likely to be impacted by teacher turnover than their peers who perform lower on the same assessments.

#### ***Overall Campus Ratings, ED Status, and Teacher Turnover***

The overall campus rating and ED status of a campus were used to predict teacher turnover in this study. Based on the analysis, the findings from this study did not indicate a student’s ED status to be a predictor of teacher turnover; however, low campus ratings were a negative predictor variable of teacher turnover. The findings of this study support the work of researchers suggesting that schools can experience increased pressures, such as teacher turnover, due to accountability systems (Gjefsen & Gunnes, 2020), especially those in low-performing schools (Weddle et al., 2021). Although student achievement scores on standardized assessments are factored into complex accountability systems, they are a single variable used to define student achievement which significantly impacts the school rating.

Additionally, a student’s ED status could impact their achievement but may not be considered to correlate with their achievement broadly. Previously, researchers indicated that

higher rates of low SES student populations contributed to disparities in student outcomes (Gustafsson et al., 2018; Kotok & Knight, 2022). These findings were in broad terms and not specific to elementary mathematics scores. This does not mean that the ED status of a campus cannot impact student achievement, rather the ED status of a campus does not predict teacher turnover in this study. Income-based eligibility programs such as the FRPL program do not include other variables such as parental education, local or neighborhood resources, housing stability, or other characteristics associated with a student's educational experiences (Domina et al., 2018).

Domina et al. (2018) studied the FRPL as part of the NSLP in terms of its designation to students as ED and their achievement on standardized assessments. Their study is particularly relevant to this study because ED was suggested, through predictive validity, to correlate to lower student achievement. This describes a cyclical process in which low student achievement scores result in low campus ratings leading to increased teacher turnover. An increase in teacher turnover is related to lower student achievement scores and the downward trend continues unless a policy, practice, behavior or other intervention disrupts the cycle.

### **Recommendations for Future Research**

Future research, specifically on teacher turnover in Texas, would be supported by having specific campus teacher turnover data, not just district teacher turnover data, to better understand the effect that teacher turnover has on student achievement. In order to access this data, partnerships with local districts must be developed to better understand data tracking systems and processes of teachers within the district. Access to campus-specific data would allow researchers to identify other potential variables that may impact teacher turnover, which are not easily identifiable without campus specific data. One way to address this could be changes to the

requirements that campuses and districts must report teacher turnover data to the TEA. An enhanced or more defined reporting system would allow researchers to identify campus patterns in teacher turnover that may exist without relying on survey results from a set number of participants. Along with enhanced reporting measures, specificity in teacher turnover by position would also help researchers determine what patterns occur in job mobility. For example, teachers may remain in the profession but move to other positions such as campus administrators, district level support, or central office support, which would be included in turnover rates. While this study could not determine this level of specificity from the data, access to this information could enhance future studies.

### **Recommendations for Best Practice**

Mentor programs can be an effective tool for teacher retention. Quality mentoring programs last longer than just the first year for a teacher and can help develop a sense of self-efficacy among teachers (Feng et al., 2018; Inman & Marlow, 2004). Strong mentor programs can contribute to a positive work environment, further contributing to teacher success which would reduce teacher turnover. The reduction in teacher turnover could lead to improved student achievement scores. Mentoring programs can constitute a single, standalone event at the beginning of the school year before it starts or multiple events over multiple years for some teachers (Hahs-Vaughn & Scherff, 2008). School administrators can build trust over time through mentor programs when designed to support novice teachers. Part of the mentorship programs should be centered around explicitly addressing the concerns of a novice teacher, not just general teaching concerns or practices (Hopkins et al., 2019). Although mentor programs can be an effective tool for novice teachers, when campuses experience high turnover rates year after

year, the effectiveness of the mentor program may be reduced because the campus loses the experience of teachers in the mentor role (Blizard, 2021b).

School leaders should also consider how the work environment for teachers may factor into teacher turnover. The work environment for teachers can be defined as the conditions of their schools, not necessarily the district or teaching profession as a whole, and this environment is a contributing factor to teacher turnover (Hanks et al., 2020). A social structure exists for teachers in the classroom environment. Understanding how it operates contributes to teacher resiliency, which may help teachers appropriately respond to adverse seasons in the school system leading to higher retention levels (Muller et al., 2011). Improving teacher work environments and teacher expectations could be an effective strategy for reducing teacher turnover (Hanks et al., 2020). In addition, improving the work environments for teachers increases job desirability as discussed by Dizon-Ross (2020), which was related to a teacher's inclination to stay or leave the profession.

A teacher's work environment is vital to the job satisfaction of a teacher and the career decisions made throughout the teacher's educational career (Billingsley, 2004). Petty et al. (2012) found that even in high-need schools, teachers' desire to stay at their campus is strongly related to a positive school environment and care for students. Positive, collegial relationships and mentorship from more experienced faculty on campus significantly combat teacher attrition (Inman & Marlow, 2004). Although workplace satisfaction alone cannot determine retention, establishing a culture that supports collaboration and shared responsibility can increase teacher satisfaction within the classroom and the school (Garcia Torres, 2019). The opportunity to problem-solve and complete tasks in a shared environment increases self-efficacy in new teachers, leading to retention (Inman & Marlow, 2004).



## Conclusion

Through this research, it was indicated that teacher turnover has negative effects on student achievement and that campus ratings from accountability systems also negatively impact teacher turnover. What is not clear is the extent in which teacher turnover affects student achievement. The effects of teacher turnover on the mathematics standardized assessment in grades three through five in Texas, which included all student populations in the sample for analysis were observed in this study. Are some student populations impacted more than others? Do other confounding variables impact student achievement more than teacher turnover? Further research is needed to appropriately answer these questions.

In addition to teacher turnover, the ED status of a student can also negatively affect their academic performance (Domina et al., 2018). Studies on teacher turnover centered around campuses with high ED rates could provide a clearer picture of the impact on student achievement. What is known through research, is that high teacher turnover rates exist on campuses with low student achievement scores, high numbers of ED student populations, and high minority, non-White student populations (Loeb et al., 2005; Watlington et al, 2010). Studying student race/ethnicity as a variable with teacher turnover could reveal concerns of equity and student achievement.

In their research on math achievement among Black male students in elementary and middle school, Zilanawala et al. (2018) suggested that Black men are underrepresented in categories of academic success and overrepresented in those associated with failure. Furthermore, urban campuses serving both high populations of ED students and non-White students experience higher rates of teacher turnover (Brummet et al., 2017). If a single factor alone of either ED status or non-White race/ethnicity has implications on student achievement

and access to high quality teachers, both of these factors combined could put students who meet these criteria at an even greater disadvantage than their peers. It is the responsibility of educators, policymakers, and society as a whole to ensure success for all students.

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