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Next Education Workforce Model: An Examination of Teacher Engagement

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Abstract

The Next Education Workforce (NEW) model represents an innovative reimagining of the traditional classroom and seeks to support increased student learning and teacher capacity. This study leverages longitudinal administrative data on teacher leave within a single district. We use a two-way fixed effect design to examine the relationship between NEW model participation and teacher engagement. We find that while teachers on NEW teams are no more likely to stay within their school district the following year, teachers on a team take significantly fewer days off, even after controlling for within-teacher attendance trends over time. In addition, we find that teachers on teams request significantly fewer substitute teachers than their non-team peers, thus providing a more stable learning environment for their students and likely saving their district money. These findings are important given recent concerns about teacher retention, job satisfaction, and substitute teacher shortages and the impact of these factors on student learning.

Next Education Workforce Model: An Examination of Teacher Engagement

While student absentee rates continue to plague schools (NCES Information Staff, 2022), teacher absenteeism and related substitute teacher shortages leave the students who do come to school with an inconsistent learning environment (National Council on Teacher Quality, 2014). This has important impacts on both students' academic learning, as well as their socioemotional learning (Jackson, 2018; Sorensen & Ladd, 2020; NCES Information Staff, 2022). Therefore, better teacher attendance will likely lead to increased student learning while also ameliorating the shortage of substitute teachers. The Next Education Workforce model of teacher teaming is one strategy that may lead to better teacher attendance.

The Next Education Workforce (NEW) model originated at the Mary Lou Fulton Teachers College at Arizona State University (ASU), one of the largest teacher education schools in the country. It represents an innovative reimagining of the traditional classroom. NEW works on a theory of a workforce design problem as opposed to a workforce supply problem (Maddin & Mahlerwein, 2022). The model seeks to support increased student learning and teacher capacity by assigning a team of teachers to a larger group of students through a shared roster. In 2021-22 we studied the model through teacher surveys, observations, interviews, and administrative data. Initial qualitative evidence suggested that teachers report multiple benefits from the model. This current study builds on our understanding of the model by closely examining teacher retention and engagement of team members. We leverage district administrative data to examine the relationship between being a member of a teacher team and teacher attendance and substitution requests during the school year. In addition, we investigate the relationship between team membership and teacher retention the following school year.

While we find no significant difference in retention between team teachers and their non-team peers, we do find that teachers on a team take one day less on average of paid leave — a significant reduction. In addition, we find that these same teachers also request significantly fewer substitute teachers than their peers, approximately two days less. These differences provide evidence that team teachers have increased engagement and job satisfaction, even after controls to account for bias. The results also have important implications for student learning, as research suggests that teacher attendance is critical to students' academic (Herrmann & Rockoff, 2012) and non-academic learning (Gershenson et al., 2016; Jackson, 2018). In addition, the reduced leave and substitute teacher requests provide evidence of tangible cost saving to the district.

This paper proceeds as follows: We begin with a review of the literature on teacher satisfaction as it relates to retention; and teacher engagement as evidenced by their attendance and resulting substitution requests. We then describe the NEW model and context in the Mesa Public School district. We next present the research questions that guided this work, describe our data, and discuss our two-way fixed effect analytic strategy. Finally, we present our findings, discuss the importance of the findings to current education policy and finance, and conclude with thoughts on future work.

Review of the Literature

While teacher attrition has long been a primary consideration in education policy, its importance post-pandemic has been key to discussions of regaining pandemic learning loss. As such, strategies that improve teacher satisfaction and retention are desirable.

While there are strategies for better understanding teachers' levels of job satisfaction, one clear proxy measure for a teacher's job satisfaction is engagement measured through attendance. As with chronic student absences, chronic teacher absence is a negative indicator of teacher engagement and satisfaction.

Teacher Job Satisfaction

Job satisfaction is generally defined as having a positive reaction to the workplace (Worrell et al., 2006). Within the field of education, research suggests that teacher job satisfaction may come from several different sources (Toropova et al., 2021). For example, research suggests that positive social relationships are more likely to increase teacher job satisfaction (Sylvia & Hutchinson, 1985) and may play a crucial role for teachers (Van Droogenbroeck et al., 2014). Teacher working conditions, such as class size, school leadership, building conditions, and compensation, were correlated with teachers' perceptions of self-efficacy and commitment to continuing their teaching assignments (Bascia & Rottmann, 2011; Green & Muñoz, 2016).

Research also suggests that positive relationships with colleagues, parents, and students are related to teacher satisfaction (Cano-Garcia et al., 2005; Gavish & Friedman, 2010; Skaalvik & Skaalvik, 2011). Furthermore, while teacher job satisfaction was found to have minimal impact on student achievement (Banerjee et al., 2017), teachers with higher levels of job satisfaction are less likely to feel overly stressed and emotionally burnt out (Skaalvik & Skaalvik, 2011), a factor that is critical to retaining teachers post-COVID (Sparks, 2022b).

A teacher's commitment to the profession is also linked to job satisfaction and retention. Literature on the topic identifies three primary qualities associated with teacher commitment: "First, the employee holds a strong belief in the goals of the organization. Second, the employee invests in the organization by expending effort. Finally, the employee desires maintaining a position within the organization" (Reyes,1990 pg. 328)."

Similarly, teacher collaboration has been shown to lead to increased job satisfaction. Work by Goddard, Goddard, and Tschannen-Moran (2007) suggests that effective collaboration improves teacher morale, job satisfaction, and student outcomes. Further research by Goodard and colleagues (2010) found direct effects of teacher collaboration on student achievement and an indirect effect of principals' instructional leadership on student achievement mediated by collaboration. These findings were similar to research conducted by Ronfeldt and colleagues (2015), who found that high-quality teacher collaboration, specifically using instructional teams, was positively associated with student achievement gains in both reading and math.

The literature also suggests strong links between teacher job satisfaction and teacher efficacy. Work by Klassen and Chiu (2010) found that teachers with a higher belief in their classroom management and instructional strategies were more satisfied with their teaching role. In another study (Caprara et al., 2006), researchers found that teachers with high levels of self-efficacy were more likely to create and promote the conditions that positively impact their job satisfaction, such as developing personal relationships with other teachers.

Teacher Retention

Teacher retention refers to the ability of educational institutions to retain qualified and experienced teachers over an extended period (Lochmiller et al., 2016). Retention is crucial for building a stable and experienced teaching workforce and promoting educational quality and student achievement (Jacob et al., 2012).

Teacher retention is a challenge for districts. For instance, nearly half of new entrants leave within the first five years of teaching (Ingersoll et al., 2018; Ingersoll & Strong, 2011). A recent National Education Association survey found that 55% of teachers seriously contemplate leaving their profession earlier than planned (Walker, 2022). Two separate reviews of teacher recruitment and retention (Borman & Dowling, 2008; Guarino et al., 2006) found that white teachers and teachers in science and math were among the teacher groups with the highest attrition rates. Furthermore, a recent study examining the effects of the COVID-19 pandemic on teacher retention found significant increases in year-to-year turnover from the 2021-22 to 2022-23 school years (Bacher-Hicks et al., 2023; Camp et al., 2023). In addition, Bacher and Hicks (2023) found a sharp increase in teacher turnover among new hires compared to pre-Covid levels. Conversely, teachers with higher rates of job satisfaction and positive work environments were more likely to stay year to year, independent of the school's student demographic characteristics (Bascia & Rottmann, 2011; Green & Muñoz, 2016; Johnson et al., 2012).

The inability of schools and districts to retain teachers, especially high-quality teachers, can have a profound impact in several areas. For example, research by Ronfeldt and colleagues (2013) found that high teacher turnover rates are detrimental to student achievement. Specifically, students in grades with the highest turnover scored lower on English Language Arts (ELA) and math assessments year over year. Moreover, schools serving low-income students bore the brunt of the negative impacts of turnover. A recent study on teacher attrition in Washington, D.C., Public Schools found that the district's inability to retain teachers deemed "highly effective teachers" led to reductions in student learning (James & Wyckoff, 2020). More specifically, the district's inability to replace those exiting the district with similarly effective teachers led to a reduction in student learning of about two months in ELA. In addition, work by Henry and Redding (2020) on within-year teacher turnover found that losing a primary classroom teacher during the school year results in a loss of between 32 and 72 instructional days for students.

Teacher turnover is also costly: Districts must allocate resources to train and recruit teachers, with some estimates exceeding $20,000 per teacher in replacement costs (Carver-Thomas & Darling-Hammond, 2017). The National Commission on Teaching and America's Future estimates that 7.3 billion dollars annually is allocated for finding, developing, and training new teachers (NYU, 2017). The costs associated with failing to retain teachers are not just financial. Work by Sorensen and Ladd (2020) on middle school teacher turnover in North Carolina found that high teacher turnover rates increased the share of math and ELA teachers with less experience, without full licensure, and without certification year over year. Failure to retain teachers can also lead to higher-than-average class sizes, which is contrary to research stressing the value of small class sizes on student achievement (Sorensen & Ladd, 2020). Furthermore, failure to retain teachers leads students to miss the non-academic benefits of strong student-teacher relationships, such as reduced suspensions and improved attendance (Jackson, 2018).

Teacher Engagement

Teacher Attendance

Teacher attendance refers to the regular presence of teachers in educational institutions during scheduled working hours (National Council on Teacher Quality, 2014). It signifies the commitment of teachers to fulfill their professional responsibilities and ensures the continuity of instruction for students (Guerrero et al., 2013).

While not all teacher absences are created equally (Frontline Education, 2016), teacher attendance, or lack thereof, can significantly impact the stability and quality of education systems. With approximately six percent of classroom teachers absent during the school year (Liu et al., 2022), high rates of teacher absenteeism can disrupt classroom instruction, impede student learning, and create instability in schools (National Council on Teacher Quality, 2014).

For example, a 2008 study concluded that students spend roughly one school year without their assigned teacher during their K-12 education due to teacher absenteeism (R. Miller et al., 2008). In another study of the impact of teacher absenteeism on student achievement, researchers found that for every ten days of teacher absences, students' math achievement is reduced by 3.3 percent of a standard deviation (R. Miller et al., 2007). Recent data from the Institute of Education Sciences found that nearly half of the schools in SY 2021-22 had higher rates of chronic teacher absenteeism, defined as missing 10% of school days or more than the previous school year (Sparks, 2022a).

Teacher absenteeism has a marked effect on student achievement. Research by Herrmann and Rockoff (2012) found that ten additional teacher absences lead to significant decreases in math and moderate decreases in ELA student assessment scores. Furthermore, teacher absences are not spread equally: lower-income, Black, and Hispanic/Latino students are disproportionately more prone to experience teacher absences than their White counterparts (R. Miller, 2012). Moreover, teacher absenteeism can have a detrimental effect on student's social-emotional learning and academic expectations, especially for lower-income and minority students (Gershenson et al., 2016)

Substitute Teachers

Chronic teacher absenteeism further strains the already diminished pool of substitute teachers, with many districts simply unable to find substitutes (Ordway, 2023). Subsequently, students in under-resourced schools are more likely to experience both chronic teacher absenteeism and a lack of access to credentialed substitute teacher coverage (Clotfelter et al., 2007; Liu et al., 2022). Teacher absenteeism is also quite costly for districts. Estimates pin the costs associated with teacher absenteeism (e.g., finding and hiring substitute teachers) for approximately 1% of annual public education spending (Hansen & Quintero, 2020; R. Miller et al., 2008).

Ultimately, teacher attendance and retention are inextricably linked: the more teachers are absent or exiting the system, the worse student academic outcomes are (National Council on Teacher Quality, 2014). The literature does offer models for retaining teachers and increasing teacher attendance and commitment. For example, a review of research by Ingersoll & Strong (2011) concluded that new teachers who participated in teacher induction or mentoring programs were

more likely to remain in the profession beyond five years. Similar work by Shuls and Flores (2020) found that administrations that promote and support teacher induction programs and personalized professional development were more likely to retain new teachers and keep experienced educators longer.

Additionally, incentives and supportive administrations can help to reduce teacher absenteeism and promote retention. For example, districts that added incentives, such as small bonuses for missing less than seven days or providing additional retirement contributions for low absentee rates, were found to reduce overall teacher absentee rates (Hansen & Quintero, 2020). Furthermore, schools where teachers report higher rates of job satisfaction and positive work environments were more successful in achieving higher levels of teacher retention and reducing teacher absenteeism (Toropova et al., 2021).

The literature clearly shows that teacher attendance and retention depend on teacher satisfaction. Whether through incentives or positive work experiences, the more satisfied teachers are with their work conditions and environment, the more likely they stay in the school year to year. The NEW model aims to increase teacher satisfaction, attendance, and retention by supporting teachers. Below, we discuss the NEW model's potential to support increased student learning and build teacher capacity.

Support Through Collaboration and the NEW Model

Teacher collaboration refers to educators working toward a common goal, such as developing new teaching strategies for student learning outcomes or increasing teacher effectiveness (Vescio et al., 2008). This collaboration can take many forms, such as planning and co-teaching lessons, analyzing student data, engaging in professional communities, and providing feedback and support to each other (Ostovar-Nameghi & Sheikhahmadi, 2016). Teacher collaboration aims to enhance the quality of education provided to students through educators' collective expertise, creativity, and problem-solving skills (Vangrieken et al., 2015).

The NEW model reimagines the typical classroom of an isolated teacher in a single class of students and instead enables a team of teachers with varying experience and subject expertise to share a group of students (Labaree, 2004)). NEW is based on teachers supporting each other through collaboration on a team (Maddin & Mahlerwein, 2022). Under the NEW model, teachers within or even across grades collaborate. This model is different from traditional team teaching in that teachers share a roster of students, allowing them to pool resources and leverage individual strengths. Similarly, members of these teams support one another, potentially leading to stronger relationships, less burnout, and increased overall job satisfaction.

Selection into a NEW team varies. The Mesa School District partners with ASU and promotes the NEW model. Teachers may also hear about teams from peer teachers. In some cases, teachers are recruited by their principals. In others, teachers may request the creation of a team. These teams can contain all teachers within a grade or be composed of a single pair of teachers. A school may pilot a small team and expand the team model to an entire grade or school. In short, there is no systematic approach to how teams manifest.

However, all NEW model classrooms contain a team of teachers with different roles and responsibilities who share a roster of students. This enables teachers to work collaboratively and

ensures that all teachers have a shared responsibility for the group of students. For example, while teams vary greatly across and even within schools, a shared roster is one characteristic of NEW teams. This means that while teachers on a team may plan together, co-teach, or otherwise support each other, they also share a group of students, sometimes within a single grade or across adjacent grades. These teachers are equally responsible for these students and consider the entire group "their" students.

The variation within the NEW model allows teachers to leverage team members' talents, experience, and expertise to distribute these skills more evenly across larger groups of students. ASU describes this as an evolving model. Teachers with subject expertise can specialize, thus benefiting more students within the shared roster. Similarly, a team allows larger groups of teachers with more varied experiences to collaborate, support, and mentor one another. For example, a more experienced teacher can mentor new teachers, providing them with needed support while providing all students with access to instruction from more skilled teachers. These factors fundamentally change teachers' working conditions. No longer is a single teacher relegated to a class of 25 students behind a closed door.

In our earlier qualitative work, teachers and administrators said they saw increased retention among their teams. For example, one administrator stated during an interview, *"Personally, I can tell you what I see. Teacher retention, less teacher burnout."* Similarly, survey results indicated that team teachers reported significantly higher job satisfaction and anecdotal reports of less burnout. For example, one teacher noted, *"I think I wouldn't want to go back to the other way of teaching before. How much support I have, I feel like we have done leaps and bounds and taken chances and done things that changed up things, tried new things that would've taken ten years, and we've done in a year and a half."* Personnel managing teams also indicated that they believed that team teachers requested fewer substitute teachers than their non-teamed peers because they could rely on the help of their teammates to fill in for them in their absence.

This study seeks to understand the relationship between the NEW model and teacher outcomes, including teacher satisfaction, retention, and engagement.

Research Questions

The study provides an empirical view into the NEW models' impact on teachers' retention and engagement. Specifically, this research focuses on teacher-level outcome measures, including teacher retention and attendance as proxies for teacher engagement and satisfaction and teacher quality.

This research study addresses the following questions:

1. Is participation in the NEW models associated with increased teacher retention?

2. Is participation in the NEW models associated with increased teacher engagement, as measured by teacher attendance?

3. Is there evidence that teacher quality mediates these effects?

Unfortunately, due to COVID and recent changes to the Arizona state test, analyses of student-level test score data are unreliable. Additionally, the anecdotal results from an earlier study of the

NEW program indicate that the greatest observable impact of the program appears to be on teacher outcomes. Therefore, we examine longitudinal data on teachers in the Mesa school district in 2021-22 and the following fall for evidence of persistence compared to earlier years of data.

The study compares teacher retention from the 2021-22 to 2022-23 school years for NEW team teachers, controlling for teacher- and school characteristics. In addition, we examine potential differences over time in teacher attendance between NEW schools and teachers and non-NEW comparisons, taking both time effects and the teachers' previous attendance and sub-requests into account. Finally, examine whether any effects differed by teacher quality.

Data

The data include all teachers from the 2021-22 academic school year within Mesa Public Schools ("Mesa"). To look at teachers' attendance and substitution request patterns over time, these records include leave- and substitute requests as far back as the 2017-18 academic year. In addition, we were provided with retention information for teachers in the sample still employed in the fall of 2022 to look at teachers' retention. ASU defined NEW team teachers as those who were "in class," meaning that their primary job duty was that of a teacher instead of an administrator or other primary role. In addition, a NEW team teacher must have attended a summer NEW training session.

That analytic sample consists of just over 3,100 teachers, 138 of whom were classified as part of a NEW team. The appendix includes more details on the final analytic sample contents. A complete discussion of descriptive data follows.

Teacher Demographics and Experience

Most teachers in Mesa are female (76.6%) and white (92.5%). These features also hold for NEW team teachers at 87% and 92.8%, respectively. Similarly, about 14.5% of all the teachers in our sample are ethnically Hispanic, while 17.4% of NEW team teachers are Hispanic. Compared to the student body of these schools, where only 38% of all students are white, and 47% are Hispanic, there is a considerable mismatch between the race of the teachers and their students. Table 1 below describes the NEW team teacher characteristics compared to the average characteristics of teachers in the entire district and non-NEW teachers.

Table 1

Mesa Unified School District Teacher Demographics: District, NEW, and Non-NEW

	District Total		NEW Teachers		Non-NEW Teachers	
	N	*%*	*N*	*%*	*N*	*%*
Total Sample	3,112		138		2,974	
Gender						
Female	2,383	76.6	120	87.0	2,263	76.1
Male	729	23.4	18	13.0	711	23.9
Race						
White	2,879	92.5	128	92.8	2751	92.5
Black	80	2.6	2	1.5	78	2.6
Asian	52	1.7	2	1.5	50	1.7
American Indian	32	1.0	1	0.7	31	1.0
Hispanic	6	1.9	0	0.0	6	0.2
Pacific Islander	1	0.6	0	0.0	2	0.7
Multiracial	59	1.9	5	3.6	54	1.8
Other	1	0.3	0	0.0	1	0.3
Missing	1	0.3	0	0.0	1	0.3
Ethnically Hispanic	452	14.5	24	17.4	428	14.4

Nearly 52% of MESA teachers work at the elementary level, while 70% of NEW team teachers in our sample teach in elementary grades, indicating that teams are more prevalent in the early grades in this context. Further, the average Mesa teacher has taught for just over 13 years and within the Mesa district for almost nine years. In comparison, team teachers have less experience—the average teaching experience of team teachers at 10.5 total years and almost eight years in Mesa. See Table 2 below for details.

Table 2

Mesa Unified School District Teacher Level and Experience: District, NEW, and Non-NEW

	District Total		NEW Teachers		Non-NEW Teachers	
	N	*%*	*N*	*%*	*N*	*%*
Total Sample	3,112		138		2,974	
Elementary	1,615	51.9	97	70.2	1,518	51
Junior high	432	13.8	9	6.5	423	14.2
High school	922	29.6	22	15.9	900	30.2
Missing/floating teachers	143	4.6	10	7.2	133	4.4
Teacher Experience						
Total years	13.1		10.5		13.1	
Mesa years	8.7		7.7		8.9	

Teachers in our sample taught across 64 schools, with team teachers serving in 17 of those schools. All teachers' average enrollment was 871 students, while NEW team teachers taught in larger schools that averaged just over 933 students. However, this difference is relatively small, considering the wide variation and range in Mesa school size.

Table 3

Mesa Unified School District School-Level Characteristics: District, NEW, and Non-NEW

	District Total	NEW Schools	Non-New Schools
Average School Enrollment	871	933.1	871
sd	7989	1042.7	799
range	336-3699	336-3641	336-3699
Number of Schools	64	17	64

Teacher Quality

We used several proxy measures related to teacher quality to examine whether teacher quality influences teacher engagement. First, we looked at teacher evaluations for teachers in 2020-21 and 2021-22. Because many teachers were missing evaluations, we constructed an "any evaluation" variable that combined teacher evaluations across both years. Teachers may have been missing an evaluation for many reasons, as not all teachers received an evaluation every year, and different schools had different evaluation policies.

When looking at evaluation levels in 2020-21, almost 41% of all teachers and 53% of NEW team teachers received a "highly effective" evaluation ranking. This trend held in the 2021-22 academic year, with 27% of all teachers and 47% of NEW team teachers rated as highly effective. When looking at the "any evaluation" variable that combines all available evaluation information from both years, we found that 41% of all teachers and 53% of team teachers were ranked as "highly effective," and only three total teachers received an "ineffective" rating. It is a common finding that most teachers are rated as either practical or highly effective (Weisberg et al., 2009). Therefore, we opted to examine other possible outcomes for evidence of quality and engagement, including certification levels.

Table 4

Mesa Unified School District Annual Evaluations: District, NEW, and Non-NEW

	District Total		NEW Teachers		Non-NEW Teachers	
	N	*%*	*N*	*%*	*N*	*%*
	3,112		138		2,974	
Annual Evaluations						
2020-21						
Highly effective	1,390	44.7	77	55.8	1,313	44.1
Effective	843	27.1	23	16.6	820	27.5
Developing	45	1.4	3	2.1	42	1.4
Ineffective	0	0.0	0	0.0	0	0.0
Missing an evaluation	834	26.8	35	25.4	799	26.8
2021-22						
Highly effective	838	26.9	65	47.1	773	25.9
Effective	879	28.2	26	18.8	853	28.6
Developing	64	2.1	4	2.9	60	2.0
Ineffective	3	0.1	0	0.0	3	0.1
Missing an evaluation	1328	42.7	43	31.2	1,285	43.2
Any Evaluation						
Highly effective	1,270	40.8	73	52.9	1,197	40.2
Effective	1225	39.4	38	27.5	1,187	39.9
Developing	76	2.9	4	2.9	72	2.7
Ineffective	3	0.0	0	0.0	3	0.1
Missing an evaluation	538	16.7	23	16.7	515	17.3

Most teachers in the sample were certified, and most held standard certifications (93%). However, 4% of people in classrooms do not appear to be certified or are missing information about their certification status. Due to the sample's small variation in certification level, this teacher characteristic is unlikely to provide much evidence of differences in teacher quality between team teachers and their non-team peers.

Mesa Unified School District Teacher Certification Levels: District, NEW, and Non-NEW

	District Total		NEW Teachers		Non-NEW Teachers	
	N	*%*	*N*	*%*	*N*	*%*
	3,112		138		2,974	
Principal	86	2.8	4	2.9	82	2.8
Standard	2,861	91.9	129	93.4	2,732	91.9
Non-Standard certification	26	0.8	0	0.0	26	0.9
No Certification	90	2.9	3	2.2	87	2.9
Missing	49	1.6	2	1.5	47	1.6

Teacher Engagement through Attendance

We also looked at the number of days teachers were present and the number of days they requested substitute teachers during the year as a proxy for teacher engagement.

First, we examined the total number of days a teacher was out of school. In Table 6, teachers who were on a team in the 2021-22 academic year appeared to miss fewer days than their non-NEW team peers, and this trend appears across multiple years, including before they participated in a team. This suggests that teachers who later participated in teams might have differed from their non-team peers before the team models began. For example, in 2017, teachers took an average of almost ten days off, while teachers who would later be on a team took just under nine days off. In 2021, this difference was nearly identical at 9.90 days for all teachers compared to 8.55 days for NEW team teachers.

In addition to comparisons between NEW and non-NEW teachers, Table 6 shows the average difference in teacher absences from 2017 to 2021. Note the decrease in the average number of days teachers were absent during the 2019 and 2020 school years across all three groups. This is likely due to COVID and policy changes in Mesa during those two school years. For example, teachers taught virtually during parts of both school years. In addition, Mesa required a 10-day mandatory quarantine period for teachers with COVID. However, those days were not counted as a teacher absence during those two school years if a teacher presented a positive COVID test.

Table 6

Mesa Unified School District Teacher Absences: District, NEW, and Non-NEW

	District Total	NEW Teachers	Non-NEW Teachers
2017 Total Days	9.8	8.8	9.8
sd	7.2	5.4	7.2
range	0-72	0-29	0-72
2018 Total Days	8.5	7.7	8.5
sd	6.5	6.3	6.6
range	0-65	0-33.5	0-65
2019 Total Days	6	5.8	6
sd	5.4	6.1	5.3
range	0-71	0-43	0-71
2020 Total Days	5.3	4.8	5.3
sd	6.9	6.1	6.9
range	0-95	0-43	0-95
2021 Total Days	9.9	8.6	10
sd	8	5.9	8
range	0-80.5	0-29	0-80.5

Table 7 investigates the number of days a teacher requested a substitute. Table 7 shows that, except for 2018, teachers who would later join a team requested fewer substitute teachers than average. For example, in 2020, team teachers requested a substitute teacher for 5.3 days compared to 6.7 days of substitute requests from non-team teachers.

It is also interesting to note that the number of substitute days varies by year. For example, in 2017, teachers requested an average of 3.6 substitute days compared to 3.1 days for people who would later join a team. By the 2021 school year, this number had increased to almost 13 days for the average teacher and 11 days for team teachers.

Table 7

Mesa Unified School District Average Days with a Substitute Teacher:
District, NEW, and Non-NEW

	District Total	NEW Teachers	Non-NEW Teachers
2017 Total Days	3.6	3.1	3.6
sd	4.4	4.7	4.4
range	0-54	0-36	0-54
2018 Total Days	11.2	11.4	11.2
sd	10	8.4	10
range	0-170	1-51	0-170
2019 Total Days	8.4	8.2	8.4
sd	9.1	9.4	9.1
range	0-178	0-79	0-178
2020 Total Days	6.7	5.3	6.8
sd	9.9	6.5	10.1
range	0-153	0-43	0-153
2021 Total Days	13	11	13
sd	12.3	8.5	12.4
range	0-171	0-57	0-171

Retention

Teacher retention, especially during post-COVID shortages, was an especially important consideration. Thus, we examined trends related to teacher retention and whether team teachers were more likely than their non-team peers to stay. The data on retention were limited to a single year. If teachers were present in the 2021-22 school year, they were considered "retained" if they were still teaching in the district in the fall of 2022-23. Nearly 83% of all teachers and 86% of team teachers were retained. Because we only have one year of retention information and very little variation within that year, this variable provides us with limited comparative information about any potential differences between the retention within the two groups. As a result, estimates should be interpreted with these limitations in mind.

Methods

We begin by estimating naïve regressions, relating teacher's outcomes to the teacher's participation on a team and simple controls for observed differences in the following way:

$$Y_{it} = \beta_1 TEAM_{it} + \gamma X_{it} + \varepsilon_{it} \qquad (1)$$

In which Y is teacher i's outcome (i.e., leave requests, substitution requests, or retention) in year t. We model the outcome as a linear function of teacher i's participation in a team in year t, a vector of teacher i's observable characteristics in time t, X, which includes certification, experience, gender, race, ethnicity, and teacher quality, and an error term. The standard errors are clustered at the school level to account for within-school correlations.

Our main estimates of interest are the relationship between teachers' participation on a team in year t and their outcome in that year, β_1. Both the magnitude (i.e., the difference in the number of days a team teacher requests leave) and the statistical significance is important to understanding how teachers' behavior is related to teams.

We next add school-level characteristics to account for potential systematic differences in leave behavior at the school level. Specifically, we add teacher i's school-level characteristics in year t, including the percentage of white students, the percentage of students learning English, and the percentage of students that qualify for free or reduced-price lunch. We alternately estimate a model with school-fixed effects to understand how the behavior of teachers on teams varies from their within-school peers.

However, for teachers' leave and substitution requests, the data also include teachers' prior request behavior, which these first three specifications do not account for. Therefore, to control for the changes in teacher behaviors over time, we next include controls for teachers' prior leave (or substitute) requests in years of up to four prior years, depending on how many years the teacher has worked in the district. In years that teachers' leave requests are missing, we include the average of all other prior years of leave requests. Including the average allows us to include all teachers working in the district at least the prior year and utilize a longer history of leave information when available. However, the estimates are not sensitive to the specification of how we include the teachers' prior requests.

We next employ a more rigorous method, two-way fixed effects, which are essentially difference-in-differences estimates. This model utilizes each teacher's own history of requests, as well as annual differences in requests. Including time fixed effects is especially important in this context, as the period includes the COVID pandemic.

This model more fully accounts for how teachers that ended up on a team had different leave- and substitution requests from their peers before joining a team, as well as differences team teachers made after joining a team. We estimate the following two-way fixed effects model:

$$Y_{it} = \beta_1 TEAM_{it} + TFE_i + YR_t + \varepsilon_{it} \qquad (2)$$

Where teacher i's leave or substitute requests in year t are now modeled as a linear function of the teacher's membership in a team in year t, a teacher fixed effect (TFE), a time fixed effect (YR), and an error term. Standard errors are clustered at the school level.

One limitation of our approach is that we are unable to account for systematic differences across schools over time, as teachers are only matched to their schools within the data for the 2021-22 school year. Thus, we cannot test the robustness of our estimates by including school-level controls or fixed effects.

Findings

Teacher Retention

The administrative data provides information for teachers during the 2021-2022 school year and whether they were retained in the following school year. We estimate Equation 1 using logistic regression and estimate each of the three specifications described above. Our main estimate of interest is the coefficient for 'team,' displayed in Table 8 below, as the odds ratio that a team teacher will be retained.

As highlighted above, these retention data give limited evidence of potential differences between team retention and non-team teachers, especially as most teachers were retained from both groups. Therefore, it is unsurprising that we detect no difference between the two groups of teachers. Specifically, the first specification predicts that team teachers are slightly more likely to remain in Mesa (1.001 times more likely), and the second and third specifications predict that team teachers are slightly less likely to remain in Mesa (i.e., .89 and .93 time less likely, respectively).

Table 8 shows that membership in a team in the 2021-22 school year predicts no difference in the probability that a teacher will be retained in the fall of 2022. The estimates remain very small and insignificant across all specifications.

Table 8

Three Models Estimating Differences in Teacher Retention Among NEW Teachers

	(1)	(2)	(3)
Team Coefficient	1.001	.890	0.931
sd	(0.40)	(0.32)	(0.36)
Constant Coefficient	2.023	1.791	1.324
sd	(0.96)	(2.63)	(0.63)
N	2,570	2,456	2,545
Teacher Characteristics	X	X	X
School Characteristics		X	
School Fixed Effects			X

*Notes | * p < .10; **p < .05; ***p < .01.*
Teacher controls include: certification, experience, gender, race, ethnicity, and teacher quality, and an error term. School controls include: the percentage of white students, the percentage of students learning English, and the percentage of students that qualify for free or reduced-price lunch.

Teacher Engagement: Attendance

To address our first research question, "Is participation in the NEW models associated with increased teacher engagement, as measured by teacher attendance?" we measure engagement through a proxy measure, teacher attendance, or the number of days a teacher was away from school. The assumption here is that less engaged teachers are more likely to take more days off

in a year, whereas NEW teachers supported within their teams might take fewer days away from their work and their students.

Table 9 presents our estimates of the total number of days teachers took off during the 2021 school year using the simple regression analysis presented in the section above. Column 1 presents estimates from the first model, defined above. Specifically, column 1 presents the estimated relationship between NEW team membership and total leave, controlling only for teacher-level characteristics. These estimates indicate a statistically significant difference: team teachers take off about one and a half fewer days than their non-NEW peers.

When we control for school-level factors, first as measured by the percentage of white students in the school, the percentage of students qualifying for free-or-reduced lunch, and the percentage of students learning English in the school, we see that team teachers take off a little over one day, 1.116 days, fewer than their non-team peers serving similar groups of students. These estimates are marginally significant, with a p-value of 0.115.

In column 3, we consider systematic differences at the school level by including school fixed effects. The magnitude of our estimates remains relatively stable; team teachers take off about one less day (0.940 days) than their non-team peers within the same school. However, this estimate is less precise, with a p-value of 0.171.

Table 9

Five Models Estimating Differences in Leave Requests Among NEW Teachers

	(1)	(2)	(3)	(4)	(5)
Team Coefficient	-1.550**	-1.116	-0.940	-1.093	-1.206*
sd	(0.70)	(0.70)	(0.68)	(0.73)	(0.63)
Constant Coefficient	6.104***	8.421***	5.183***	6.595***	8.978***
sd	(1.02)	(3.20)	(0.98)	(1.07)	(0.17)
N	2,499	2,391	2,499	2,362	12,164
Teacher Characteristics	X	X	X	X	
School Characteristics		X			
School Fixed Effects			X	X	
Teachers Previous Attendance				X	
Teacher Fixed Effects					X
Time Fixed Effects					X

Notes | * p < .10; **p < .05; ***p < .01.
Teacher controls include: certification, experience, gender, race, ethnicity, and teacher quality, and an error term.
School controls include: the percentage of white students, the percentage of students learning English, and the percentage of students that qualify for free or reduced-price lunch.

The within-school estimates are important in this context, as participation in the NEW model is generally selected by school leaders. However, as Table 6 shows, team teachers also took fewer days off even before their participation in the team. Thus, we next add controls for each teacher's

leave patterns by controlling for the teacher's leave request from prior years. These estimates are presented in column 4 and show that teachers on teams still take roughly one day less (1.093) than non-team peers within their schools, even after considering their own leave history. This estimate remains marginally significant with a p-value of 0.140.

The final column includes our two-way fixed effect estimates, in which we control for a teacher's entire history of leave requests and take time trends into account. These estimates are essentially difference-in-difference estimates and are substantively similar to our other estimates. That is, these estimates suggest that team teachers take off one fewer day (1.206) than their non-team colleagues, and these estimates are significantly different from zero (p-value of 0.061).

Thus, all specifications provide consistent evidence that team teachers take approximately one day less than their non-team peers. Most estimates are also statistically or marginally statistically significant. These findings provide evidence that team teachers are more engaged, as measured by increased attendance.

Substitute Requests

As another way to measure differences in teacher engagement, we explore changes in the number of days team, and non-team teachers requested substitutes. These analyses show that team teachers request approximately two fewer days of substitute teachers' time than their non-team peers. These findings suggest that team teachers can rely on their team members to provide a stable learning environment when they are away from the classroom.

As with our analysis of leave requests, we begin by looking at naïve regression estimates, controlling only for teacher characteristics, as defined in Equation 1. These estimates are presented in column 1 of Table 10 and show that team teachers requested substitute teachers to cover their classrooms approximately 2.4 days less than Mesa teachers with similar characteristics who were not on a team. These estimates are significantly different from zero, with a p-value of 0.010.

In column 2, we control for school characteristics; in column 3, we include school fixed effects; and in column 4, we include both school fixed effects and each teacher's history of substitute requests. All estimates of the relationship between membership on a team and substitute requests are approximately two fewer days of a substitute request, and statistically significant.

Table 10

Five Models Estimating Differences in Substitute Teacher Requests Among NEW Teachers

	(1)	(2)	(3)	(4)	(5)
Team Coefficient	-2.416***	-1.955**	-2.201**	-2.313***	-2.290***
sd	(0.90)	(0.81)	(1.03)	(0.49)	(0.58)
Constant Coefficient	9.077***	8.274	7.235***	2.519	2.290***
sd	(1.76)	(5.78)	(1.75)	(1.89)	(0.19)
N	2,571	2,456	2,571	2,383	12,198
Teacher Characteristics	X	X	X	X	
School Characteristics		X			
School Fixed Effects			X	X	
Teachers Previous Attendance				X	
Teacher Fixed Effects					X
Time Fixed Effects					X

Notes | * $p < .10$; **$p < .05$; ***$p < .01$.
Teacher controls include: certification, experience, gender, race, ethnicity, and teacher quality, and an error term.
School controls include: the percentage of white students, the percentage of students learning English, and the percentage of students that qualify for free or reduced-price lunch.

In column 5, we include our two-way fixed effects models. As with all other specifications, the estimates suggest that team teachers request substitute teachers for approximately two (2.290) fewer days than their non-team peers.

As discussed above, these analyses suffer from data limitations. In particular, the inability to control for factors that may impact teachers' substitute requests over time, like their school environment, limits the analysis's accuracy. However, the consistency of the estimates across different model specifications, including the two-way fixed effects models, supports the finding that team teachers request fewer substitute teachers for approximately two school days during the year.

Teacher Quality

Investigating if teacher quality mediates our findings was our third research question. However, the data presented some challenges in detecting teacher quality. As described in the data section, we first looked at teacher evaluations as a potential measure of teacher quality. However, we had access to evaluation data for only two years, and many teachers were missing an evaluation. Further, those with an evaluation were rated as effective or highly effective. Because of the lack of variation in evaluation ratings, it was difficult for us to detect any measurable differences. Nevertheless, we did control for these evaluation in our models. This does not necessarily mean there are no meaningful differences in teacher quality between the two groups. It simply means that we could not detect them with the data.

We also turned to information on teacher certification as a potential second measure of teacher quality. However, once again, most teachers in our sample had standard certification. As such, we did not have enough variation in certification levels to detect differences between the two groups. Despite the challenges, we did control for certification in our models when feasible.

Teacher experience is another potential proxy for teacher quality. As noted above, we included teacher experience in each model. Estimates show that there are some differences in teacher experience. For example, more experienced teachers take fewer days of leave. More experienced teachers are also more likely to be retained. The statistical significance of these estimates varies with how 'experienced' is defined (e.g., categorically or continuously and how the categorical variables are defined). In addition, aside from the average differences, estimates provide no evidence that there are significant differences between the behavior of team teachers with more (or less) experience compared with their district colleagues of similar levels of experience.

Discussion

The NEW model reimagines a traditional classroom. The model groups teachers into teams serving larger groups of students to improve student learning and provide teachers with extra support and flexibility.

Our earlier research, which studied the model through teacher surveys, interviews, and classroom observations, provided evidence that NEW teachers collaborated more with colleagues, were more satisfied with their jobs as teachers, and had stronger interactions with their students than their non-team peers. This study builds on these insights by leveraging administrative data from all Mesa teachers. Specifically, we seek to understand how joining teaching teams is related to teacher engagement and retention. By comparing team teachers to their peers in the district, within their schools, and with their own behavior before joining a team, we seek to control for bias and estimate the true link between changes in teacher engagement, proxied by leave requests, substitute requests, and team participation.

Our results are consistent across specifications. For example, we find no change in retention during the one year of retention data we can access. (Although we note that most teachers were retained in the district during the period we study.)

In contrast, we consistently find that NEW team teachers take an average of one less day of leave. These results are consistent across all specifications. Similarly, we find that on average, NEW team teachers request substitute teachers for two fewer days per school year.

These estimates suggest that teachers do become more engaged when they participate as a NEW team member and provide additional evidence about how becoming a team teacher changes teachers' engagement and job satisfaction. These results are especially promising, given the current teacher shortages and morale concerns.

In turn, team teachers' increased attendance and decreased need for substitute teachers provide students with a more stable and stronger learning environment. This is a particularly important finding, as research suggests that increased teacher attendance positively impacts students' academic- and socioemotional learning (Jackson, 2018; Sorensen & Ladd, 2020; NCES Information Staff, 2022).

Thus, our research suggests that NEW models are a promising way to provide increased support to both teachers and students. In addition, the reduced leave and substitute teacher requests provide evidence of cost savings to the district and relief for substitute shortages.

Conclusion

Teacher engagement matters. While engagement is evidenced through teacher retention, it is also evidenced by teacher attendance. Teacher attendance is particularly important when there are significant shortages in substitute teachers, as is the case currently. In this study, we examine the impact of the NEW model of teacher teams and find compelling evidence that teachers on a team take fewer days of paid leave. In addition, we find that these same teachers also request significantly fewer substitute teachers. These findings suggest that team teachers are more engaged with their work than their peers. The results have important implications for student learning. Finally, reduced substitute teacher requests save the district around $300 per year per team teacher. In our small sample of team teachers, this amounts to nearly $50,000 a year in savings.

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