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Exploration of Academic Outcomes in Arkansas's Four-Day School Weeks and Year-Round Calendars

Summary Points

- In the 2023-24 school year, 34 Arkansas districts operate using a four-day school week and 6 use a year-round calendar.
- Students in **4DSW** districts are performing similarly to students in districts with a traditional calendar in academic growth, achievement, and absenteeism.
- Students in **YRC** districts demonstrate some negative outcomes
- Results from **4DSW** districts showed small but statistically significant positive impact in literacy growth.
- Results from **YRC** districts showed statistically significant negative impacts in literacy proficiency rates and student attendance.

This Brief

This brief provides an overview of the findings from a research report examining the academic outcomes of Arkansas school districts using a four-day school week or year-round calendar. We aim to shed light on trends related to academic outcomes. We assess the impacts of recent calendar changes in this context and make recommendations.

Introduction

In 2021, Arkansas passed Act 688, giving school districts flexibility in choosing their calendars. As a result, several Arkansas districts adopted non-traditional calendars. In the 2022-23 school year, twenty-seven districts operated under a 4DSW, and six operated using a YRC. The number of districts using 4DSW continues to increase around the state. In the 2023-24 school year, thirty-four districts use a 4DSW calendar while six districts use a year-round calendar.

Previous research from the Office for Education Policy explored the motivations behind non-traditional calendar adoption. District leaders discussed monitoring the evidence of the successful implementation of a new calendar through academic performance and student absenteeism.[1]

This report serves as a continuation of prior research examining observed changes in student academic growth, achievement, and absenteeism for districts that implemented a four-day school week or year-round calendar.

Prior Research on School Calendars

A traditional school calendar in Arkansas is structured for 178 school days from August to May. Schools divide the nine months into two semesters with a two-week winter break, a one-week break in the spring, and a twelve-week break in the summer. Although Arkansas districts have comparatively recent experience in adopting and implementing non-traditional school calendars, these calendar structures have been a consistent feature of the United States educational landscape since the 1960s. The sections below will briefly present the prior literature about 4DSW and YRC in regard to student academic growth, achievement, and absenteeism.

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Prior Research Four-Day School Weeks

Studies on academic achievement in four-day school week districts have yield mixed results. Anderson and Walker (2015) found positive relationships between a 4DSW and reading and mathematics performance in Colorado.[3] Conversely, Morton's (2021) analysis in Oklahoma suggested negative, though statistically insignificant, effects on standardized math and English Language Arts (ELA) achievement.[4] Thompson's (2021) study in Oregon indicated negative effects on standardized math and reading test scores, partly attributing the decline to reduced instructional hours.[5] Morton and Thompson (2023) conducted a multi-state analysis, finding significant negative effects on reading and math achievement, especially in non-rural schools. Conversely, [6] a Rand Corporation report (2021) found no adverse effects on student achievement but noted slower growth in 4DSW districts compared to traditional calendar districts.[7]

Anecdotal evidence suggests that the longer weekend in a 4DSW may improve attendance due to increased flexibility.[5] However, empirical studies found no statistically significant effects on student attendance rates. Considerations beyond the school week length, such as daily start times, may impact student outcomes, with variations in school start times influencing factors like student fatigue and attendance.[3,5]

Prior Research Year-Round Calendar

The literature on YRC presents a complex picture with both positive and concerning findings regarding its implications on student achievement. One major concern is summer learning loss, particularly affecting economically disadvantaged students.[8] On the positive side, students in year-round schools perform as well as or slightly better than their counterparts in traditional schools, particularly among low-income families.[9] Successful YRC implementation appears to involve more than just rearranging the school calendar, schools providing remediation and enrichment activities during breaks achieve higher academic outcomes.[9]

However, the effectiveness of YRCs is debated. A meta-analysis by Cooper and colleagues (2003) expressed reservations about study quality, citing small sample sizes and insufficient control for confounding factors. Some rigorous studies found no significant benefits and, in certain cases, evidence of harm associated with YRC.

Study Context

This study examines the academic outcomes of Arkansas districts using a 4DSW or YRC. The structure of a four-day school week (4DSW) differs depending on the state or district.

The most popular schedule for Arkansas's 4DSW districts is to hold classes Monday through Thursday or Tuesday through Friday. The fifth day is not a required school day, but some districts offer enrichment or childcare opportunities. To meet state regulations for minimum instructional time, Arkansas districts operating with a 4DSW have longer school days compared to districts operating on the traditional calendar.

There is more variability in the structure of year-round calendar (YRC) compared to 4DSW. Typically, YRC features a shorter summer break than traditional calendars, with longer and more frequent breaks, called intersessions, throughout the school year. Despite being structured differently, Arkansas's YRC districts still operate with students in school for the same 178 days as the traditional calendar.

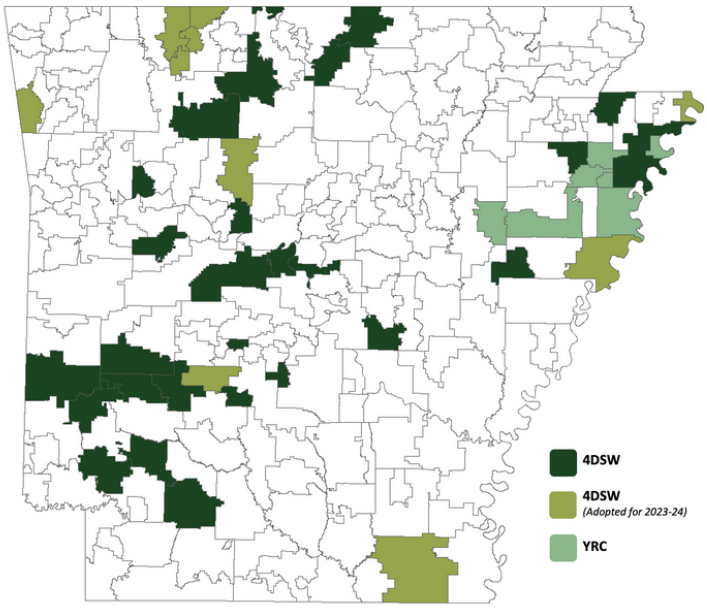
In the past several years, there has been an increase in the number of districts in Arkansas moving to the use of a non-traditional school calendar, particularly the four-day week calendar. The first noticeable increase happened between the 2019- 20 and 2020-21 school years. Since the passing of Act 688 December of 2021, Arkansas districts would have four calendar options to choose from: a traditional school calendar, an alternative school calendar, a four-day week school calendar, and a 12-month/year-round school calendar.

From the 2022-23 to the 2023-24 school year, the number districts operating a 4DSW has increased. In 2022-23, 27 districts and charter schools utilized a 4DSW. In the current school year, seven additional districts adopted a 4DSW, bringing the total number of traditional public-school districts using this calendar to 34. The districts operating a 4DSW represent roughly 13% of all Arkansas's districts. Figure 1 to the right displays the locations of districts utilizing non-traditional calendars.

Overall, the districts using non-traditional calendars are smaller and have a higher percentage of students facing economic disadvantages than the average district in the state.

More information about the changes and trends of Arkansas' district's calendars can be found in the full report.

Figure 1:
Arkansas School Districts Operating on Non-Traditional Calendars, 2023-24



Analytic Approach

This research study examines the relationships of 4DSW and YRC on academic growth, student achievement, and absenteeism. Our report uses publicly available school data provided by the Arkansas Department of Education through the ADE Data Center. This data allows the public to search and compare public schools and districts across Arkansas. To explore these outcomes, we placed districts utilizing 4DSW and YRC into cohorts based on the year a non-traditional calendar was adopted. We used grouping by cohort to account for the variation in the timing of different districts adopting non-traditional calendars. This allowed us to compare districts that adopted the same calendar in the same year, mitigating potential impacts of external contexts unrelated to the calendar change on the outcomes of interest.

Our analysis comprises two parts: examining trends in student academic growth, achievement, and absenteeism before and after calendar adoption and employing a differences-in-differences (DiD) model to statistically assess the implications of adopting a non- traditional calendar on student outcomes. We employed a rigorous matching procedure to ensure that our analyses compare districts that are similar in nearly all aspects except for the type of calendar they use. We matched each 4DSW and YRC district with three comparison districts based on the following criteria: total enrollment size the year prior to calendar adoption, the percentage of students eligible for free and reduced-price lunch the year prior to calendar adoption, and academic growth and proficiency rates in literacy and mathematics for the two school years prior to calendar adoption.

A full list of school districts by calendar type, cohorts, and comparison districts can be found in the full report.

Trends Analysis

We first examined trends in outcomes of interest before and after adopting a 4DSW or YRC for each cohort. We calculated the average outcomes for each cohort from 2016-17 to 2022-23, excluding the 2019-20 school year due to COVID-19 testing disruptions. We use comparison groups from matching process to identify differences between 4DSW and YRC districts and comparison districts on the traditional calendar. The results from this analysis display the averages of all non- traditional calendar districts in the cohort compared to the average of all traditional calendar districts. This analysis allows us to observe the general trends in student outcomes for both 4DSW and YRC districts compared to similar districts using a traditional calendar.

Difference-in-Differences (DiD) Analysis

While the trends analysis allows us to see how non-traditional calendar districts perform over time, we employ a difference-in-differences (DiD) analysis to assess any changes in our outcomes of interest after calendar adoption. The DiD method is a quasi-experimental approach that compares the changes in outcomes over time between a treatment group (districts that adopted a non-traditional calendar) and a control group (comparison districts using a traditional calendar). By comparing the changes in outcomes between the two groups, we can isolate the effect of the calendar change from other factors that may be affecting student outcomes. The outcomes of interest for the trends analysis and DiD analysis are presented below in Table 1.

Table 1:
Outcomes of Interest for Trends and DiD Analysis

Outcome of Interest	Description
Student Value-Added Growth in Literacy & Math	• Metric captured from the state administered assessment for grades 3-10 in literacy and math. • Compares actual growth to expected growth based on up to four years of prior achievement. • Growth scores are not very correlated with outside of school factors factors such as poverty. • Growth scores at the district level range from 60 to 86 with a mean of 80.
Student Proficiency Rates in Literacy & Math	• Metric captured from the state administered assessment for grades 3-10. • Represents the percentage of students scoring proficient in literacy and mathematics
Attendance	• Average percentage of students attending school each day.

We examine each outcome of interest in each analysis for the overall student population and for students eligible for free or reduced-price lunch (FRL), a proxy for low socio-economic status.

Results - Trends Analysis

Results from the trends analysis are displayed in Tables 2 and 3 below.

Table 2 illustrates the comprehensive positive and negative trends for 4DSW and YRC districts compared to the respective districts' pre-calendar adoption conditions. A plus sign (+) indicates that the cohort's average score for the outcome of interest was higher than the average score for the same outcome in the year prior to the adoption of the new calendar. A minus sign (-) indicates that the average value for the outcome of interest was lower after adopting the new calendar. An equal sign (=) indicates that the value for the outcome of interest remained the same after adopting the new calendar.

Table 2:
Overall Positive and Negative Results Compared to Pre-Adoption Outcomes from Trends Analysis, by Cohort and Calendar Type

	4DSW						YRC
	Cohort 1			Cohort 2		Cohort 3	
Outcomes of Interest	*1 Year Post*	*2 Years Post*	*3 Years Post*	*1 Year Post*	*2 Years Post*	*1 Year Post*	*1 Year Post*
Value-Added Growth Literacy	+	+	+	+	+	+	+
Value-Added Growth Literacy FRL	-	+	+	+	+	+	+
Value-Added Growth Math	-	-	+	+	-	+	-
Value-Added Growth Math FRL	-	-	+	+	-	+	+
Literacy Proficiency	-	-	-	+	+	-	-
Literacy Proficiency FRL	-	-	-	+	+	=	-
Math Proficiency	-	-	-	+	+	+	-
Math Proficiency FRL	-	-	-	+	+	-	-
Attendance	+	+	-	-	-	+	+
Attendance FRL	+	+	=	-	-	+	+

Average literacy growth for students in 4DSW and YRC districts was higher than pre-adoption scores in all years for the overall student population. This trend is similar for literacy growth for FRL students except for Cohort 1's 4DSW districts, which experienced a lower growth score one year following calendar adoption.

Average student math growth varied more than literacy growth for students in the 4DSW and YRC districts. No consistent pattern emerged. Literacy and math proficiency rates for Cohort 1's 4DSW students were lower post-calendar adoption for the overall student population and FRL students one, two, and three years post-calendar adoption. Since pre-adoption scores for Cohort 1 districts were gathered from the 2018-19 school year, the decreases in literacy and math proficiency rates are most likely driven by the COVID-19 pandemic. No discernible patterns emerge for other 4DSW cohorts or YRC regarding proficiency rates. Additionally, attendance rates varied with no consistent pattern across 4DSW cohorts or YRC.

Table 3 summarizes the overall positive and negative trends observed in 4DSW and YRC districts compared to comparison districts using a traditional school calendar. A plus sign (+) indicates that the average score for the cohort's outcome of interest was higher than the average score for the same outcome in the comparison districts. A minus sign (-) indicates that the average value for the outcome of interest was lower than the average score in the comparison districts.

Table 3:
Overall Positive and Negative Results Compared to Comparison Districts by Calendar Type

	4DSW						YRC
	Cohort 1			Cohort 2		Cohort 3	
Outcomes of Interest	*1 Year Post*	*2 Years Post*	*3 Years Post*	*1 Year Post*	*2 Years Post*	*1 Year Post*	*1 Year Post*
Value-Added Growth Literacy	+	-	+	+	+	-	-
Value-Added Growth Literacy FRL	+	-	+	+	+	+	-
Value-Added Growth Math	-	-	+	+	+	-	-
Value-Added Growth Math FRL	+	-	+	+	+	-	-
Literacy Proficiency	-	-	-	+	-	+	-
Literacy Proficiency FRL	-	-	+	-	-	+	-
Math Proficiency	-	-	-	+	+	-	+
Math Proficiency FRL	-	-	+	+	+	-	-
Attendance	-	+	+	+	+	+	-
Attendance FRL	-	+	+	+	+	+	-

The results presented in Table 3 do not show any consistent trend for any outcome of interest. A more detailed look at the trends analysis is available in the full report.

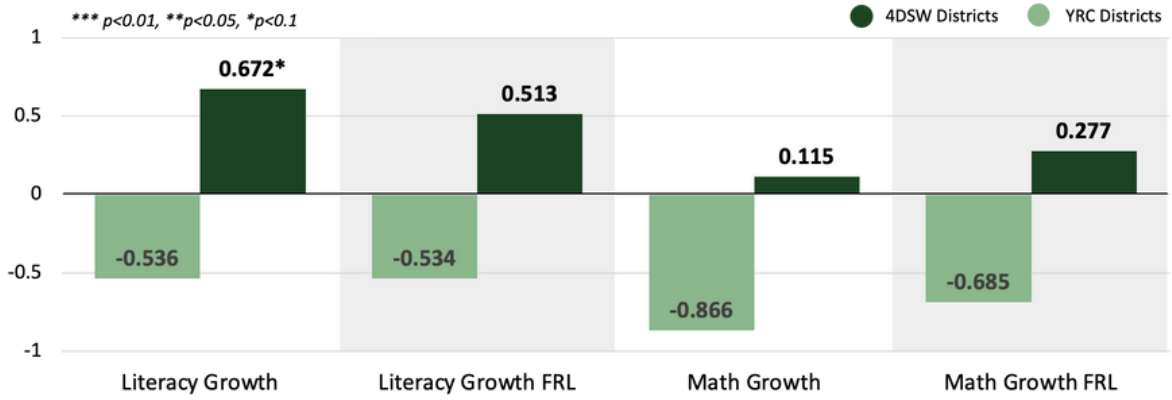
Results - DiD Analysis

The results from the difference-in-differences analysis are shown below. The single coefficients in the table represent the difference in averages of each outcome of interest between non-traditional calendar districts and their comparisons. DiD can be explained using the following equation with μ representing the average of our outcome of interest:

$$(\mu_{Treatment\ Post} - \mu_{Treatment\ Pre}) - (\mu_{Control\ Post} - \mu_{Control\ Pre})$$

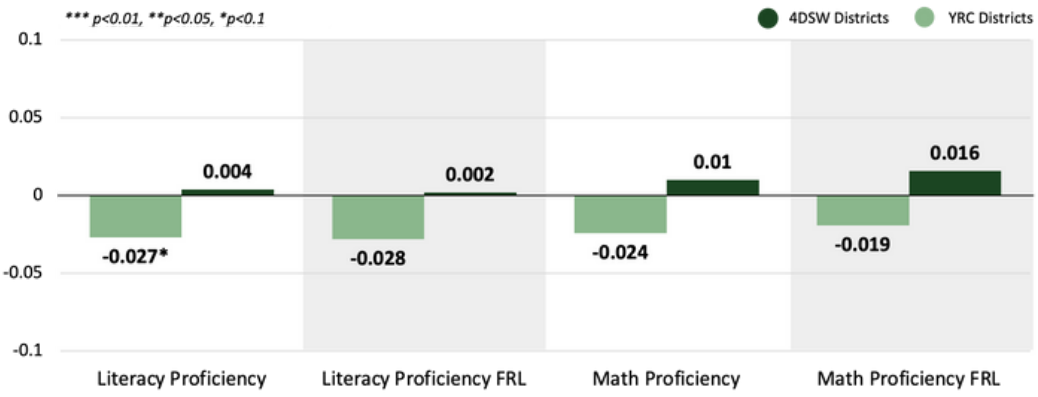
The results from the DiD analysis are presented in Figures 2, 3, and 4 below.

Figure 2:
Value-Added Growth Results, pooled DiD Analysis



In comparison to similar districts, 4DSW districts exhibited a 0.67-point increase in overall literacy growth. This result statistically significant at the 90% confidence level. The literacy growth among FRL students also increased by 0.51 points, though this change lacked statistical significance. Regarding math growth, 4DSW districts displayed a 0.11-point increase for the overall student population and a 0.28-point increase for FRL students, but these differences were not statistically significant. Conversely, the implementation of a YRC correlated with decrease in math and literacy scores for both students groups.

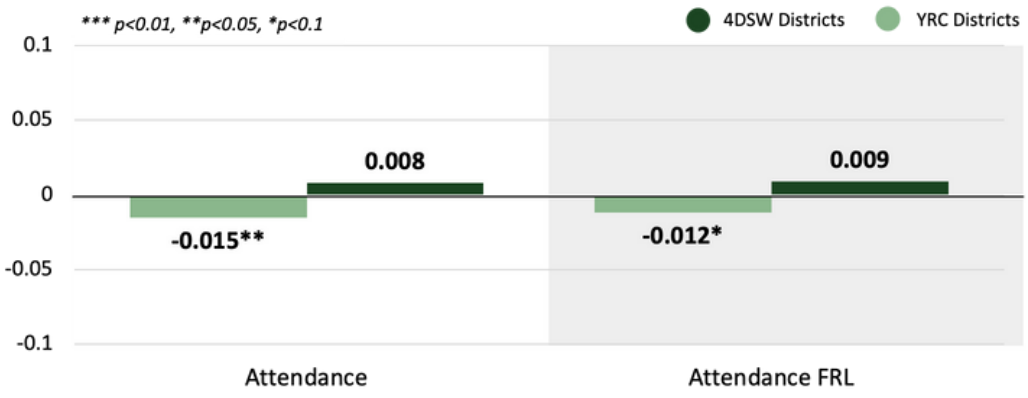
Figure 3:
Student Achievement Results, pooled DiD Analysis



4DSW districts demonstrate a 0.4 percentage point boost in overall student literacy proficiency and a 0.2 point increase for FRL students. 4DSW districts experienced a 1.0 and 1.6 percentage point increase in math proficiency rates for the overall student population and FRL students, respectively. However, none of these proficiency estimates are statistically significant

In contrast, YRC districts exhibit a statistically significant 0.27 percentage point drop in literacy proficiency for all students and a 0.28 point decline for FRL students. The results for math proficiency indicate a non-significant decrease of 0.24 percentage points and 0.19 points for all students and FRL students, respectively.

Figure 4:
Student Attendance Results, pooled DiD Analysis



Districts implementing a 4DSW experience a non-significant 0.8 percentage point rise in attendance rates for all students and a 0.9 point increase for FRL students. Conversely, adopting a YRC correlates with a statistically significant 0.15 percentage point decline in attendance rates for all students, significant at the 95% confidence level.

A parallel reduction of 0.12 percentage points is observed in the attendance rates for FRL students in YRC districts. This result is statistically significant at the 90%confidence level.

The lack of statistical significance and relatively small coefficient estimates suggest that adopting a 4DSW does not significantly influence the targeted student outcomes. Students in 4DSW districts perform similarly to those in comparison districts across examined outcomes. While only three out of ten outcomes showed statistical significance for adopting a YRC, implying no uniform impact, significance in literacy proficiency and attendance, coupled with negative coefficient estimates, suggests students in YRC districts may be more affected than in 4DSW districts. It is important to note, however, that districts have the autonomy to create their own schedules and school structures within the 4DSW or YRC. Not all non-traditional calendar districts may be experiencing the same patterns, as our results represent the average of 4DSW districts and YRC districts.

Conclusions

This research contributes to understanding the relationship between implementing a non-traditional school calendar, specifically 4DSW and YRC, and specific educational outcomes within Arkansas. This comprehensive analysis of multiple cohorts explored trends and outcomes related to student academic growth, achievement, and attendance. Since all calendar options must adhere to a minimum number of instructional hours, there is little reason to expect changes in educational outcomes for students enrolled in districts that have switched to a 4DSW or YRC.

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Policy Recommendations

The results from the trends analysis varied with no consistent pattern in our outcomes of interest. Results from the DiD analysis were small and mostly not statistically significant. Overall, the results for 4DSW districts show no discernible positive or negative relationships between the school calendar and our outcomes of interest, however, the results for 4DSW districts are positive and statistically significant for literacy growth scores. The DiD analysis for YRC returned all negative results. Three of the outcomes of interest, literacy proficiency rates for the overall student population, and attendance rates for both student groups returned negative statistically significant values for YRC districts. The results from the DiD analysis in tandem with the trends analysis, lead us to the conclusion that YRC districts are not performing as well as their comparison districts using traditional calendars. Based off of our findings from this analysis of non-traditional calendars in Arkansas, we suggest:

Districts adopting 4DSW or YRC should engage in a collaborative planning process

- Involve stakeholders, including teachers, staff, students, parents, and the broader community, in the decision-making process.

Non-Traditional calendar districts should prioritize high-quality instruction

- Equip educators with effective pedagogical strategies and ongoing professional development. Structure school time effectively for targeted support and more time for literacy and math
- instruction.

Conducting additional research focusing on non-traditional calendars

- Monitor the effects of various calendars on academic growth, achievement, family dynamics, teacher recruitment and retention, and the utilization of unscheduled time.
- Identify best practices and make policy adjustments as needed.

Adopting a new school calendar requires careful consideration of the local context and ongoing evaluation of its effectiveness. Arkansas districts' experiences provide valuable insights for optimizing educational structures for long-term student success. While calendar changes may hold promise, school and community culture, along with instruction quality, shape student outcomes. Cultivating a positive school environment, empowering educators, and engaging families are essential for holistic student success. Districts must prioritize these elements when considering calendar adjustments to align with their educational goals.

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