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POLICY BRIEF

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LOSS OF LEARNING TIME: A CASE OF UNINTENDED CONSEQUENCES

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KEY TAKEAWAYS

- In 2018, the Missouri Legislature removed the minimum requirement for public schools to be in session 174 days. The requirement that schools be in session for 1,044 hours remained in place.
- The removal of the number-of-days requirement led to the proliferation of the four-day school week.
- This policy change also had the unintended consequence of reducing overall time in school. We estimate a loss of 17 to 29 hours of school per year for the average student.

OVERVIEW

In their 2016 edited volume, *When School Policies Backfire: How Well-Intentioned Measures Can Harm Our Most Vulnerable Students*, Michael Gottfried and Gilberto Conchas highlight example after example of how policies can fail to deliver, backfire, or create unintended consequences.[1] This policy brief is an examination of one such phenomenon in Missouri. It explains how the removal of the required number of days for Missouri public schools inadvertently led to a decrease in learning time for Missouri students.

Prior to the 2019–2020 school year, school districts were required to be in attendance for at least 174 days and 1,044 hours a year. If you multiply 174 by six hours, you get 1,044 hours. Since most school days are longer than six hours, this combination of requiring days and hours resulted in most school districts going well above the minimum requirement. In 2018, language in House Bill (HB) 1606 and Senate Bill (SB) 743 removed the number-of-days restriction.[2] As a result, it was possible for school districts to reduce the number of class days as long as they still met the minimum hour requirement.

Presumably, the removal of the day requirement was intended to provide school districts with greater flexibility in meeting patterns. Indeed, a direct result of removing the day requirement was the proliferation of four-day school weeks. In 2018, there were 34 four-day school districts. These tended to be small, rural school districts.[3] By the 2023–24 school year, that number had climbed to 173 school districts—approximately one out of three Missouri school districts.[4] This number likely underestimates the number of school districts that changed their meeting pattern because of the increased flexibility. Our own review of school district calendars reveals other districts operating on "hybrid" schedules in which they meet four days every other week, or in various other arrangements. Some districts even have summer breaks just short of four months—with the average being between 13 and 14 weeks.[5] These school districts may not be identified as four-day school districts by the Missouri Department of Elementary and Secondary Education (DESE).

While Missouri school districts continued to meet the minimum hour requirement, our estimates suggest that removing the required number of days may have had the unintended consequence of reducing the total number of hours that students spent in school. In the three school years prior to the bill's passage, school districts were in session roughly 1,100 hours, on average. In the three years after the bill's passage, the average was closer to 1,070.[6] This suggests the day requirement not only impacted the number of days that schools were in session, but it also influenced the number of hours students were in school. Our estimates suggest that removing the day requirement led to a decrease of 24 hours of time in school per year.

In the sections that follow, we briefly highlight the research on time in school. We then discuss our methods for estimating the loss of time in school. After a presentation of the results, we suggest policymakers be mindful of the fact that their actions may lead to unintended consequences.

TIME IN SCHOOL

While it may seem intuitive that time in school matters, it is not as straightforward as one might imagine. As is often the case, there is "noise" in the measurement. A state may require fewer hours and get better results than a state that requires more hours. For example, Massachusetts, a state that often scores at the top in national rankings, only requires schools to be in session 990 hours while Alabama, a state that generally ranks much lower, requires 1,080 hours. The same is true in cross-national comparisons. It is estimated that students in Colombia go to school for 1,200 hours a year, while those in higher-performing South Korea go only 874 hours a year.[7] In their paper, *Time in School: A Conceptual Framework, Synthesis of the Causal Research, and Empirical Exploration,* Matthew Kraft of Brown University and Sarah Novicoff of Stanford University note that the United States is among the national leaders in time in school: "the U.S. ranks near the top of the distribution of instructional time: eighth among the 37 countries" in the Organization for Economic Cooperation and Development (OECD).[8]

Though the United States ranks high overall, there is significant variation among the states. Using data from the 2017–18 National Teacher and Principal Survey, Kraft and Novicoff estimated "that the typical K–12 public school in the U.S. is in session for 6.9 hours per day and 178.59 days per school year, on average, for a total of 1,231 hours per year."[9] They ranked Missouri 11th overall in the length of the school day, 46th in days per year, and 24th overall in total hours per year.

These numbers differ from data provided to us by DESE. Unlike the estimates of Kraft and Novicoff, which rely on surveys, our data are pulled from official state records. According to data provided to us, not a single traditional public school in Missouri was in session for more than 176 days in the 2022–23 school year. According to the DESE data, the average traditional public school was in session just 161.62 days and 1,082.81 hours, and some districts—such as Holcomb R-III, Cooter R-IV, and North Pemiscot Co. R-I—were in session for a shockingly low 138 days. This puts the Missouri average well below the average estimated by Kraft and Novicoff.[10]

With the removal of the day requirement, Missouri became one of the most lenient states in terms of requirements for the school term. According to the Education Commission of the States, 13 states do not require a set number of days in school.[11] The majority of states (28 states) require 180 days. Eleven states do not require a specific number of hours for high school students, but all these states require a specific number of days. Of the states with no specific time requirement, all but two required 180 days, with Vermont requiring 175 and Illinois requiring 185. Missouri is among the states with the least amount of time required. Just five states required fewer hours than Missouri and did not have a set number of days required.

Though the relationship is not linear, the analysis of Kraft and Novicoff paints a clear picture that time in school matters. In summarizing the findings of their systematic literature review, which included 74 studies of the causal impact of time spent in school on student learning, they write, "Overall, the empirical evidence we review establishes a clear positive causal effect of increasing total time and instructional time on student achievement. Estimates are overwhelmingly positive and significant."[12]

As noted, the returns to time in school are not linear. That is, not every additional minute in school will lead to the same level of improvement. As Kraft and Novicoff note, there are diminishing rates of return. The largest gains to additional time seem to be in international contexts or in places where students are going to school for shorter periods of time. In the United States, Kraft and Novicoff estimate that a 10 percent increase in time in school is "most likely to produce small increases in student achievement,"[13] which they identify as less than 0.05 standard deviations.

The decrease in time for Missouri school students is roughly two to three percent. Thus, it is hard to estimate exactly how much impact the lost time will have or whether the losses examined in this brief should be considered a "significant" loss of learning time. Nevertheless, generally speaking, it is fair to say that time in school matters and that Missouri students are going to school less now than they were in the past. For this reason, it is important to pay attention to how much time Missouri students are spending in school.

DATA AND ANALYSIS

To calculate the effect of removing the day requirement on time in school, we obtained data that indicated the number of hours each school was actually in session in a given year. The term "actual total hours" is used to differentiate between the number of hours actually spent in school and the number of hours they were scheduled to attend. Schools may depart from an official calendar due to any number of factors, including snow days. The data also indicate how many actual days the school was in session. These data were obtained from DESE. The data contain information for the years 2010 to 2023.

For this analysis we focused on traditional public schools. This means we removed charter schools from our analysis. Additionally, we removed special schools,

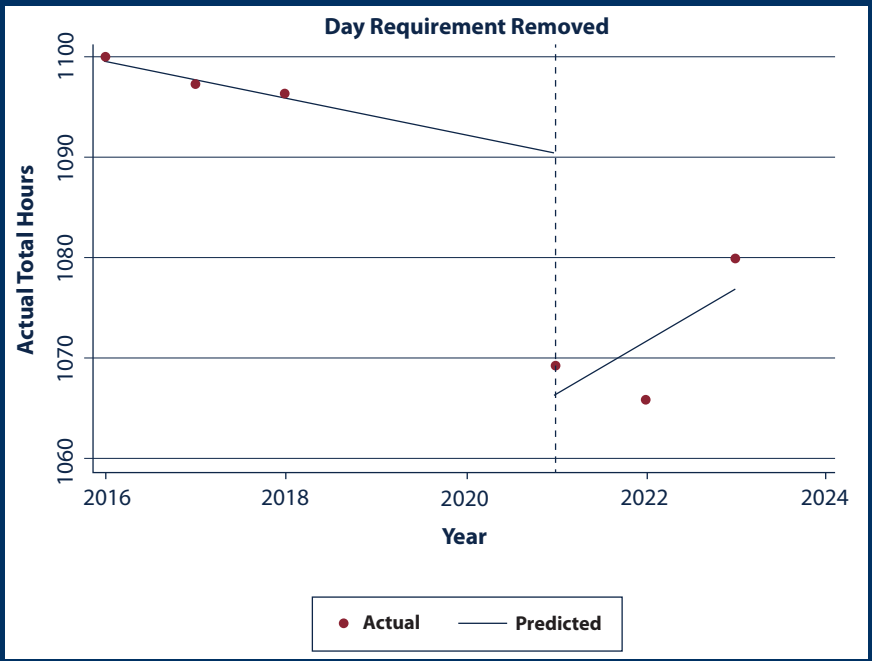
such as the St. Louis Special School District. We also removed any school that appeared to be an early childhood learning center or that had half-day kindergarten. These centers tended to report fewer actual total hours.

The goal of this analysis is to determine what impact HB 1606 had on learning time. The bill was passed in the 2018 session, but its component on instructional hours did not take effect until the 2019–20 school year. The following year, schools faced significant challenges due to the COVID-19 pandemic. Accordingly, we focus our analysis on the three years prior to the passage of the law (2015–16, 2016–17, and 2017–18) and the three years following the COVID-19 pandemic (2020–21, 2021–22, 2022–23).

Figure 1

Interrupted Time Series Analysis: Actual Total Hours

We might have expected actual total hours in 2021 to have been close to 1,090. However, the removal of the number of days requirement appears to have led to a statistically significant decrease in time in school.



Interrupted Time Series

We use two different statistical techniques to assess the impact of HB 1606 and SB 743 of 2018 on learning time. First, we start with the most rigorous, an interrupted time series analysis. This analysis treats the three years included after the bill's passage as "treatment" years. It requires each school to have data for the three years prior to the passage of HB 1606 and the three years after. The data are not reported for each school in each year, which limits the number of schools in our analysis. While this is a drawback, this analysis allows us to compare each school to itself. This creates an apples-to-apples comparison.

Our interrupted time series analysis indicates that the removal of the day requirement led to a drop of 24.13 hours of learning in the initial year after passage (and after COVID) (See Table 1 and Figure 1). Critics might suggest the hours in 2020–21 may have appeared lower due to the lingering effects of COVID and that the pandemic may have been the actual cause of the decline in the number of hours. If we had seen a rebound in 2021–22, this explanation may have been more persuasive. Instead, we saw a further drop in 2021–22 and a small rebound in 2022–23. Nevertheless, the 2023 hours remain significantly below those of the three years prior to passage of the bill. Thus, the loss appears to be attributable primarily to the change in policy.

Fixed-Effect Analysis

As a robustness check, we also conduct a fixed-effect analysis (Table 2). This analysis is not as strict, meaning it does not require schools to report data in every year of the analysis. As a result, more schools are included in the analysis. We conduct this analysis in two ways: with and

Table 1: **Interrupted Time Series Analysis, Actual Total Hours**

Variable	Coefficient	Robust Std. Err.	*p* value
Time	–1.85	0.834	0.03
First Year Post-Treatment (2021)	–24.13	3.94	0.00
Each Year Post-2021	7.17	1.39	0.00
Constant	1099.71	2.45	0.00

Number of Observations: 768
Number of School Districts: 128

Table 2: **Fixed-Effect Analysis of Hours and Days**

Variable	Coefficient	Robust Std. Err.	*p* value
Actual Total Hours (Without Year Controls)	–28.96	1.53	0.00
Actual Total Hours (With Year Controls)	–17.20	1.64	0.00
Actual Total Days (Without Year Controls)	–9.65	0.40	0.00
Actual Total Days (With Year Controls)	–8.86	0.45	0.00

Number of Observations: 2,694
Number of Groups: 959

without controlling for the year. Without the control for the year, the analysis essentially pools the data before and after passage of HB 1606 and SB 743. Without the year controls, this estimate does not account for the trends that occur over time and generates our most generous estimate of the impact of the bill, a reduction of nearly 29 hours of learning. When we control for the year in the analysis, we get our most conservative estimate of 17.2 hours lost. This likely underestimates the number of hours lost given that there is a relationship between the reduction of hours and the passage of time. The estimates from the fixed-effects analyses provide a range for us to consider.

DISCUSSION AND CONCLUSION

HB 1606 and SB 743 were large education bills with many components. One component that was added in as part of a senate committee substitute to HB 1606 was the removal of the number of days requirement for schools. Our analysis reveals that this change has had significant impacts on how often students in Missouri go to school. On average, students go to school roughly nine fewer days. Though the school day has grown longer, the additional time per day has not made up for the days lost. Our estimates suggest this policy change has led to a loss of 17 to 29 hours of school a year. Our preferred analysis, the interrupted time series, puts this estimate at 24 hours lost. If we assume these hours are cumulative over a student's 13 year academic career, it would be a loss of 312 hours or roughly one-fourth of a school year.

Many factors affect the total time students spend in school. For example, in 2019 the legislature changed when school districts were able to start the school year.[14] Pushing the start date back may have resulted in a shortened school year for some school districts. In other words, if school districts just started later in order to comply with the change but kept the same ending date, they may have reduced school time for students. While this is possible, we must remember that this adjustment—simply shortening the school year—would not have been possible without the removal of the day requirement. If the day requirement had been in place when the start of the school year was pushed back, it would have forced school districts to also push back the end date.

While the removal of the school day requirement may have provided school districts with greater flexibility,

it has inadvertently led to a decrease in time in school. By removing the requirement, Missouri students are going to school approximately 24 fewer hours per year, on average. This is a reduction of two to three percent in learning time. The change puts Missouri among the most lenient states in terms of its school time requirement.

In 2024, the Missouri Legislature reinstated some number-of-day requirements, though not as many as before and not in all places. SB 727, another large education bill, requires "a school district that is located wholly or partially in a county with a charter form of government or a school district that is located wholly or partially in a city with more than thirty thousand inhabitants" to be in session a minimum of 169 days if it is a five-day district.[15] Four-day districts in those locations must be in session 142 days. It remains to be seen what effect this bill will have on learning time. Our estimate is that this bill may only impact roughly 100 school districts.[16]

While the research is clear that learning time matters, the marginal impact of decreasing learning time, as presented in this analysis, may be interpreted by readers in one of two ways. Some may see these findings as insignificant. It is possible for readers to view the loss of learning time presented in this brief as an acceptable trade-off for the increased flexibility provided to school districts. Indeed, it is this change—removing the day requirement—that has allowed for the proliferation of four-day school weeks among Missouri's school districts. Other readers, however, may note that Missouri is already underperforming in academics and fear that an additional loss of time will only make matters worse for students. In this case, readers may advocate for increasing the day requirement.

Wherever you land on this particular issue as it relates to learning time, there is a clear lesson from this analysis. Public policy decisions often create unintended consequences. The goal of removing the day requirement was not to reduce the number of hours students spend in school. It was to provide districts with greater flexibility. In doing so, however, the legislature opened the door for school districts to cut hours and that is what many did. As a result, Missouri students spend less time in school now than they did before the passage of HB 1606 and SB 743 of 2018. Policymakers can never predict all the effects of a policy before it is enacted. Nevertheless, it is important to understand that their actions may, and often do, have unintended consequences.

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NOTES

1. Gottfried, M.A., & Conchas, G.Q. (Eds.). (2016). *When school policies backfire: How well-intended measures can harm our most vulnerable students*. Cambridge, MA: Harvard Education Press.

2. HB1606 (2018)—Modifies provisions relating to elementary and secondary education (https://www.senate.mo.gov/18info/BTS_Web/Bill.aspx?SessionType=R&BillID=75610498). Affected sections include 160.011, 160.041, 163.021, 163.073, 171.031, and 171.033. We will refer to HB 1606, but the language was identical in SB 743.

3. Frank, A. & Shuls, J.V. (June 2024). "Longer days and fewer total hours: Examining the four-day school week in Missouri." *Show-Me Institute*.

4. Ibid.

5. Frank, Avery. (May 16, 2024). "When Do Summer Breaks Start for School Districts across Missouri?" Show Me Institute; https://showmeinstitute.org/blog/education/when-do-summer-breaks-start-for-school-districts-across-missouri.

6. These figures represent 2021, 2022, and 2023.

7. Kraft, M.A. & Novicoff, S. (2024). "Time in school: A conceptual framework, synthesis of causal research, and empirical exploration." EdWorking Paper No. 22-653; https://edworkingpapers.com/ai22-653

8. Kraft & Novicoff, p. 21

9. Kraft & Novikoff, p. 4.

10. Kraft and Novicoff used 2017–18 figures to conduct their analysis. Missouri students' time in school has declined from 172.9 days and 1,218 total hours in their analysis.

11. Education Commission of the States (2023). Instructional Time Policies 2023; https://reports.ecs.org/comparisons/instructional-time-policies-2023.

12. Ibid, p. 30.

13. Ibid, p. 31.

14. HB 604—Establishes the School Turnaround Act (2019). https://house.mo.gov/Bill.aspx?bill=HB604&year=2019&code=R.

15. SB 727—Creates and modifies provisions relating to elementary and secondary education (2024). https://www.senate.mo.gov/24info/BTS_Web/Bill.aspx?SessionType=R&BillID=244.

16. Frank, Avery. (March 27, 2024). "How Will the Four-day School Week Progress in Light of SB 727?" Show Me Institute; https://showmeinstitute.org/blog/education/how-will-the-four-day-school-week-progress-in-light-of-sb-727.

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