Categorizing and Understanding Facilities and Long-term (Capital) Investments

Executive Summary

JULY 2026

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About CCERC

The Center for Connecticut Education Research Collaboration (CCERC) is a research partnership between the Connecticut State Department of Education (CSDE) and institutions of higher education across Connecticut. CSDE sets the agenda, identifies projects, and allocates funding for CCERC. The University of Connecticut manages funding and provides an administrative team. A Steering Committee composed of researchers from various Connecticut institutions guides the administrative team in developing and approving research projects and reports. Researchers from Connecticut universities and colleges constitute the research teams. The mission of CCERC is to address pressing issues in the state's public schools through high quality evaluation and research that leverages the expertise of researchers from different institutions possessing varied methodological expertise and content knowledge.

CCERC was formed initially using federal relief funds to investigate the impact of the COVID-19 pandemic on learning and well-being and recovery efforts in the state's schools. The partnership was subsequently institutionalized to respond to ongoing evaluation and research needs of the CSDE, provide research opportunities for Connecticut researchers, and foster collaboration across the state's institutions of higher education.

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During the COVID-19 pandemic, significant ARP-ESSER funds were allocated to school districts across Connecticut, in part, for long-term facilities and other physical investments. The literature suggests that school spending improves student outcomes (Jackson, 2020), school capital investments increase student academic achievements (Hong & Zimmer, 2016; Conlin & Thompson, 2017; Barrett et al., 2019; Biasi et al., 2025), and investments in air conditioning may contribute to student learning through mitigating the negative impacts of heat (Park et al., 2020). Yet, some recent literature also reports null effects of school capital spending (Martorell et al. 2016) and calls for further research on this connection (Barrett et al., 2019). The ARP-ESSER funds offer an opportunity to examine how Connecticut school districts allocate capital investments and the impacts of these investments on student achievement and other outcomes.

This study uses a mixed-methods approach to understand how Connecticut school districts spent ARP-ESSER funds on long-term facilities and other physical investments, and the impacts on student outcomes. This research project investigated five research questions:

1. In what ways did districts spend ARP-ESSER funds on long-term, capital investments?
2. Was COVID-19 a crucial element in deciding to invest in that way?
3. Were there perceived impacts of ARP-ESSER capital spending on student outcomes?
4. Did long-term capital investments affect student achievement and other outcomes (e.g. behavior, attendance)?
5. Did the impact vary by type of investment?

To answer these questions, we conducted a descriptive analysis of capital investment plans; interviews with superintendents, school principals, and other staff in 12 districts; and a quantitative analysis of the impact of planned capital investment on student academic and behavioral outcomes.

Key Findings

Research Question 1: In what ways did districts spend ARP-ESSER funds on long-term, capital investments?

The five top categories of capital investments were (1) education technology, (2) addressing learning loss, (3) improving air quality, (4) health and safety of students, staff, and educators, and (5) facility repairs or improvement to minimize disease spread. Most of these capital spending decisions were driven at the district level, rather than school-based decision-making.

Research Question 2: Was COVID-19 a crucial element in deciding to invest in that way?

Nearly all districts we interviewed allocated some resources to capital investments that met immediate pandemic-related needs. The most common short-term investment was for technology that would allow for virtual or hybrid learning. Other districts purchased individual desks to allow for social distancing or outdoor learning spaces to provide more space for students to safely return to school. However, many of the more costly capital investments, like HVAC installation or building repairs, represented long-standing needs in districts that they previously did not have the funds to support. These larger investments took longer to implement, and in some cases, never happened due to a variety of challenges. These included the limited time-horizon for spending the grant money, difficulty navigating the rising costs of labor and materials, and attempting to seek bids for the work at the same time as every other district in the state was receiving the same influx of resources. These delays may have meant that districts not already prepared to make these investments prior to the pandemic were ill-prepared to do so, and some of the larger and more costly investments (such as those to improve air quality) may have taken longer to implement.

Research Question 3: Were there perceived impacts of ARP-ESSER capital spending on student outcomes?

While some district staff were clear on the value of these facilities improvements for stopping the spread of the pandemic and preventing future virus circulation, other staff were less clear on what the impact of these funds would be. Despite a lack of obvious metrics for observing the impact of these investments, all district staff highlighted the importance of these improvements. Several districts highlighted that this influx of resources allowed them to create more equity across their buildings in terms of the learning environment, allowing them to make much-needed upgrades to buildings. For example, districts used this money to create proper air filtration across buildings, putting air conditioning in buildings in their districts that had not yet been upgraded, or remediating mold, all of which have the potential to impact student and staff health and well-being. The ARP-ESSER funds allowed them to take on those projects they otherwise would not have been able to fund without taking away from other critical needs. However, these investments take time. They explained that it will "be another couple of years, I think before all of that is actually done." Therefore, while we might expect these investments to eventually pay off in terms of student outcomes, it may take longer to see measurable results from these types of investments.

Research Questions 4 and 5: Did long-term capital investments affect student outcomes, and did the impact vary by type of investment?

Using an event study and difference-in-differences analysis, we estimate the impact of capital investments on student

outcomes. We find positive effects of capital investment on student attendance rates 1 and 2 years after the investment. We find no statistically significant effect of capital investments on assessment scores. We observe a negative (though weak) effect of capital investment for improving air quality on out-of-school suspensions, suggesting that capital investment is associated with reduced student discipline. These effects do not vary by type of investment, which are imprecisely estimated in some cases. Finally, we show that these findings are generally consistent for students from different social demographic groups, including those categorized by gender and racial groups, receipt of free or reduced lunch, or disability status. Our findings remain unchanged when we limit the sample to those who reported the start years of their capital investments, suggesting that individual districts or model assumptions do not drive the general pattern.

Study Limitations

Our results should be interpreted with caution, given the following limitations:

- Quantitative analysis is based on budget allocations, rather than data on implementation. From the qualitative work, we know that not all capital investments happened as planned, and therefore, our estimates for capital allocations might not perfectly represent the implementation of investments.
- Our results might underestimate the effect of capital investments on student outcomes. Our analysis assumes a 2021 start date for all investments with missing start years. Further, even with a 2021 start date, these projects take time to implement and time to affect student outcomes, making a 3-year post-treatment window potentially too short to observe all impacts of these funds.
- Due to the timing of our study, some of the district leadership had changed hands prior to our qualitative evaluation, limiting the district leaders' ability to speak to initial planning decisions. Further, some of the districts with larger investments were unwilling to participate due to changes in leadership or an overload of requests for research, and therefore are missing from our study data.

Regardless of these limitations, this study provides an understanding of the long-term investment decisions of districts using ARP-ESSER funds for capital investments. Our study reveals the many challenges that districts faced in allocating capital funds to meet their needs within a short timeframe, highlighting the importance of multi-year capital improvement planning. While capital investments may not have shown an immediate impact on student achievement outcomes, longer-term follow-up may be able to identify these effects. By impacting student attendance, we may expect these results to show up later.

Recommendations

These findings have several implications for future policymaking. First, school capital investment played an important role in mitigating the negative shocks from the COVID-19 pandemic, as evidenced by district investments in school facilities to upgrade educational technology, address learning loss, and improve air quality. Led primarily by school districts, these capital investments are crucial inputs to aid student learning amid COVID-19 disruptions. Second, many of the infrastructure investments were long needed, but difficult to make in the timeframe provided for these funds. More regular investments in school infrastructure in staggered intervals might allow districts to make the necessary investments on an ongoing basis, without the same challenges faced by a constrained timeline and inflated bids. Third, multi-year capital budgeting and planning can help districts track demand for school facility investment and anticipate environmental changes, such as COVID-19. Districts with existing strategic plans were better prepared to use capital investment funds and were more likely to benefit from them. While some capital items are specific to COVID-19 and situational, such as air-quality improvements, others (e.g., educational technology) can be planned and budgeted over a multi-year window. Finally, there are early, positive signs that capital investment is effective in improving student outcomes. The quantitative analysis indicates a positive effect on student attendance, a critical non-cognitive outcome. Yet a longer time window and a more systematic analysis are needed to assess the impact of capital investments on student learning, as they take time to materialize.

Stock Image

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