

ADDRESSING A

# Multi-Billion Dollar CHALLENGE

Advancing Knowledge of How High-Quality School  
Environments Can Positively Affect Educational Outcomes

FINAL REPORT | DECEMBER 2023

## APPENDICES

# Study Replication Resources

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# APPENDIX A

# Limitations and Complications of the Research

Though this was a robust investigation with statistically significant outcomes, the research team recognizes limitations of the research and complications that impacted the study, mainly as a consequence of the COVID-19 challenges that occurred during the data collection phase. Limitations and complications of the research are as follows.

## Limitations

- Like all design research conducted in the field, rather than in a lab where variables can be isolated and controlled, there is always the potential that confounding variables may unknowingly influence a study's findings. For instance, data collected in schools could be influenced by the quality of the teachers or principals at each school, or the existence of programs that are designed to impact some of the outcomes of interest (e.g., resources unrelated to the building design, such as literacy interventions or whole child interventions).
- Exposure to the school environments being studied may have varied across the range of study participants. For instance, within the student participant group, there were elementary school students, who typically spend most of their day in one primary classroom, as well as high school students, who generally move from room to room for each class period. Likewise, there were teachers who work out of one room for most of the day and others who may move between spaces. The amount and type of exposure to the classroom environment would, accordingly, differ for those who spend hours in a space versus minutes. There was an attempt to address this limitation, such as wording questionnaire and interview guide/focus group questions to reference "the typical classroom" one would experience. However, this difference in exposure and spatial experience may have influenced the participants' responses.
- Though conflicts of interest were carefully avoided, it's worth noting:
  - Perkins Eastman plans to publish and present findings from this study to leverage the company's thought leadership for marketing and communications.
  - Perkins Eastman designed new buildings and renovations for some of the schools participating in this study. In some cases, members of the research team who are also associated with Perkins Eastman conducted site evaluations in the same buildings the firm designed.
  - Perkins Eastman, Drexel University, and Invontics each received a portion of the grant funding from the American Institute of Architects College of Fellows and J+J Flooring to conduct the study.
  - Perkins Eastman hopes to secure new clients and project contracts based on the thought leadership and expertise this study provides.
- The research team followed appropriate procedures throughout the study, obtaining informed consent from all participants or their legally authorized representatives. However, it is possible the study may have been impacted through undue influence in seeking participation, such as when school administrators asked parents/caregivers to participate.
- The researchers conducted this study using the participating school districts' definition of what a 21st-century learning environment looks like. The research team recognizes, however, that a 21st-century school might look different in various parts of the country or internationally. The study also did not address 21st-century learning in virtual or home-school settings.
- Regarding IEQ, school occupants' perceptions of environmental conditions may be influenced by such things as windows that remain closed during the winter, or the fact that teachers, rather than students, typically control the lighting and operate the windows.

- Due to COVID-19 pandemic complications, the research team was unable to perform any interviews or focus groups to address Educational Adequacy. The original intent had been to interview, within a representative sub-sample of the schools, school leadership, teachers, and students from both modernized and non-modernized buildings, and an architect who was part of the design team for the modernized buildings. The EA analysis, therefore, was solely reliant on the VAT data and limited questionnaire responses. Without the qualitative understanding from the interviews and focus groups, the EA findings may not have captured a holistic understanding of the impact of modernization on EA.
- A significant gap in the CC data developed when the research team was unable to hold a focus group with Spanish-speaking parents/caregivers at School C, whose children comprise a sizable portion of that school's enrollment. Without this input, the qualitative data comes from a focus group that is not demographically representative of the student/family population of School C, therefore potentially skewing the results.

## Complications

- The COVID-19 pandemic stretched the limits of schools everywhere. Staff/administrators, teachers, and even students did not want, nor need, the added burden of anything above-and-beyond their primary responsibilities. The stressors faced by school stakeholders during this time made data collection for this study challenging, both in terms of getting schools to commit to assisting with data collection (e.g., helping organize parent/caregiver focus groups) to providing data themselves (e.g., completing a questionnaire or providing district-wide archival data).
- A similar challenge the research team faced, which others seeking to study public schools will also confront, is the need to work through school district personnel and school leadership to accomplish the parent/caregiver focus groups and community data-gathering. Without questioning the good intentions of

district and school personnel, the fact is that at any time—let alone during the COVID-19 pandemic and its aftermath—these people have numerous priorities, and a research study is unlikely to rise to the top of anyone's list. This means that, at a minimum, the speed of the study can be severely hampered and, even more problematic, there may be an inability to engage with knowledgeable people with the connections needed to recruit study participants. Having school leadership on board (and identifying the right point-of-contact to engage with at each school) is key.

- There was a challenge related to the participation of minors (i.e., the students) in the study. The study's Institutional Review Board and one of the participating school districts requested that parents/caregivers first sign off before researchers could seek informed consent from a child. This step added a layer of complexity when issuing the questionnaire and likely contributed to the smaller number of student participants from that district compared to the other one, which only required Notice of Student Participation be sent to the parents/caregivers before seeking students' consent.
- Some of the VAT assessments may have received diminished scores because, while the schools in the study had returned to in-person learning, they were still practicing social distancing as a COVID-19 precaution, meaning things like furniture configurations were not typical.
- The research team collected significantly less data than anticipated for the CC portion of the study. The original plan was to develop a Community Connectivity scale that could be used beyond the endpoint of this study; and the research team intended to cross-analyze community profiles with the data gathered from questionnaires, interviews, and focus groups. However, due to the limited responses, a meaningful synthesis of the data was not possible. Thus, the research team could not detect any significant patterns between school modernization and the conditions of a school's greater community.

# CONTACT US

We welcome further inquiry about the study and how to apply the findings to the modernization of schools.



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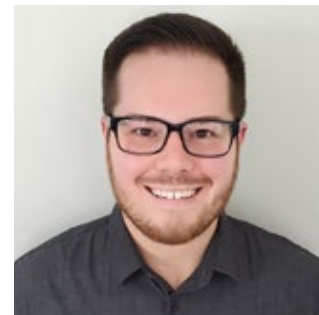
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