

Exploring Montessori Education and Charter School Innovations: A Comparative Analysis of Student Outcomes and Implications

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BACKGROUND

The public Montessori movement has been steadily growing in the United States over the last five decades. According to the Montessori Census, there are currently over 580 public schools in the US offering a Montessori program, approximately half of which are charters (National Center for Montessori in the Public Sector, 2014). Data from the National Alliance for Public Charter Schools indicate that Montessori is one of the top ten specialized models employed by charter schools in the US (White & Huang, 2022). As one of the goals of the charter movement is to identify innovative approaches to improve outcomes for children, understanding how these charter schools perform can inform education reform efforts, and the role that Montessori might play in school improvement.

RESEARCH QUESTIONS

1. How does reading and math achievement Montessori charter schools compare to reading and math achievement in non-Montessori charter schools?
2. How do students from different populations perform in reading and math when in Montessori charter schools versus non-Montessori charter schools?

LITERATURE REVIEW

A growing body of research indicates that Montessori can produce positive outcomes for students in a variety of academic and social-emotional domains. A large-scale study in South Carolina (Culclasure et al., 2018) and a longitudinal study in Connecticut (Lillard et al., 2017) are particularly robust demonstrations of positive academic and developmental results from public Montessori programs. Others have documented advantages of Montessori for literacy, math, and school readiness (Brown & Lewis, 2017; Lillard & Else-Quest, 2006; Mallett & Schroeder, 2015). Recent meta-analyses find that Montessori education has a positive impact on academic achievement (Demangeon, et al. 2023; Randolph et al., 2023). Conversely, some studies have not found any academic advantage for Montessori students (Lopata, Wallace, & Finn, 2005).

Public Montessori schools exhibit high levels of racial and socioeconomic diversity (Debs, 2016). The body of research indicates that many of the various subgroups of students found in public schools can be and have been successful in Montessori programs, including children from low-income families, children of color, and multilingual learners (Ansari & Winsler, 2020; Brown & Lewis, 2017; Culclasure et al., 2018; Lillard et al., 2017; Rodriguez et al., 2005; Snyder, Tong, & Lillard, 2022).

While the body of research around public Montessori is growing, few studies have focused specifically on Montessori charter schools. Approximately half of existing public Montessori schools are charter schools, and as the charter sector is explicitly designed as a proving ground for alternative educational models, the question of how Montessori compares to the other alternatives found in the charter world remains open.

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METHODS

For this analysis, we use district schools as the baseline comparison group. While there are many impressive and innovative district schools, the overall purpose of charter schools is to unveil potential improvements or innovations that district schools might consider implementing. Thus, district schools serve as the current standard against which models ought to be evaluated. To code the public schools as charter or non-charter, we used the charter flag from the National Alliance for Public Charter Schools. For the Montessori coding, we used data from the National Center for Montessori in the Public Sector combined with data collected from a previous project detailing the different models in charter schools (White & Huang, 2022).

For the performance data, we use Edfacts Reading Language Arts (RLA) scores and Math scores for 2018-19. To account for the different standardized tests across the nation, which have different averages and distributions, we converted all the proficiency scores to Z-scores so that we could more accurately compare schools across states. These are represented as standard deviations. Finally, because the education systems vary in quality across the nation, we normalized the data by multiplying the performance by a weight that was proportional to the difference between the states score on the National Assessment of Educational Progress (NAEP) and the national average.

RESULTS

Table 1
2018-2019 NAEP-Adjusted Reading and Math by School Type

Population	2018-19 NAEP Adjusted RLA			2018-19 NAEP Adjusted Math		
	Montessori Charter Schools	Non-Montessori Charter Schools	District Schools	Montessori Charter Schools	Non-Montessori Charter Schools	District Schools
All Students	0.29	-0.09	0.00	0.06	0.24	0.00
Children With Disabilities	0.29	-0.05	0.00	-0.06	0.40	0.00
Economically Disadvantaged	0.21	0.09	0.00	0.05	0.43	0.00
Low English Proficiency	0.42	0.34	0.00	-0.26	0.03	0.00
Female	0.18	-0.13	0.00	-0.06	0.17	0.00
Male	0.34	-0.07	0.00	0.36	0.44	0.00
American Indian / Alaska Native	-0.86	-0.18	0.00	-0.55	-0.13	0.00
Asian / Pacific Islander	-1.19	-0.12	0.00	0.17	0.38	0.00
Black	-0.08	0.14	0.00	0.03	0.33	0.00
Hispanic	0.23	0.30	0.00	-0.31	-0.21	0.00
Other / Two or More Races	-0.39	0.08	0.00	-0.21	0.17	0.00
White	0.03	-0.03	0.00	0.66	0.60	0.00
Grade 3	-0.02	-0.12	0.00	-0.06	0.14	0.00
Grade 4	-0.02	-0.11	0.00	0.08	0.23	0.00
Grade 5	0.15	-0.10	0.00	0.70	0.75	0.00
Grade 6	0.03	-0.10	0.00	-0.03	0.37	0.00
Grade 7	0.29	-0.02	0.00	-0.13	0.19	0.00
Grade 8	0.12	-0.04	0.00	0.03	0.47	0.00
Grade HS	0.30	-0.27	0.00	-0.25	-0.43	0.00

Table 1 shows NAEP-adjusted reading and math performance across Montessori and non-Montessori charter schools, using district school performance as a baseline (z-score of 0), for a variety of student subgroups. This analysis highlights both how successful Montessori charter schools were in RLA, and how inconsistent performance is in math. We see in Table 1 that the average student in a Montessori charter school performed .29 standard deviations better than the average student in district schools in RLA. The charter model alone does not explain this as the average charter school student enrolled in a non-Montessori program performed .09 standard deviations below that of their district school peers in RLA. Examining the subgroup data reveals that students with disabilities, economically disadvantaged, and English language learners all saw gains in RLA when enrolled in Montessori charter schools. Asian/Pacific Islander and American Indian/Alaska Native students, on the other hand, fared considerably poorer in RLA than in district or other charter settings. Another interesting note was that the performance of those in 3rd and 4th grade was like that of district school students, but those in later grades did better. Those enrolled in Montessori high schools were performing .3 standard deviations better in RLA than their district school peers.

Shifting over to math, we see that the average Montessori charter school student also outperforms the district baseline by .06 standard deviations. However, given that the average non-Montessori charter school student outperforms the district baseline by .24 standard deviations, other charter models are producing higher math achievement. In math, white students are the only subgroup that outperforms both the district and the charter sector.

DISCUSSION, LIMITATIONS, &

FUTURE RESEARCH

This analysis indicates that Montessori charter schools produce favorable results in RLA as compared district schools and other charter models. Children with disabilities, multilingual learners, and children from low-income families, in particular, seem to fare better in Montessori charter schools than in other settings. However, when results are disaggregated by race, it becomes apparent that these favorable results in RLA are driven largely by the performance of Hispanic/Latine and white children, while children from other racial subgroups perform better in RLA in district or other charter schools. It is also worth highlighting the positive progression seen in the RLA scores. Students in later grades performed better than those in 3rd and 4th grades, indicating a potential “sleepier effect,” a pattern shown in other datasets from Montessori schools (Hemmen, Marks, & Brown, 2023). This research suggests that the Montessori model may be somewhat uniquely structured to support longer-term literacy and English comprehension, particularly for children receiving special education services, children from low-income families, and multilingual learners.

Looking at the math scores, the paper finds that while charter schools as an aggregate perform quite well across most populations, the Montessori model does not appear to yield significant improvements over the district school baseline. STEM is one of the most popular models for charter schools (White & Huang, 2022), so it is not surprising that the charter sector performs relatively well here. Future research should investigate if there is a mismatch between the Montessori math curriculum and standardized assessments of math learning.

One key weakness of the study was the reliance on only math and ELA test scores as measures of performance. While these were the only outcome data available, previous literature highlights executive function as an area of special interest for Montessori schools, and that was not captured in these data. Readers should also note that performance in this analysis is relative, depicted in relation to district school performance as a baseline, rather than proficiency or in relation to grade level norms.

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