

# Imagine Robotify Supports Clifton Public School Students' Achievement on NJSLA

## Overview

During the 2022–2023 academic year, Clifton Public Schools in New Jersey implemented Imagine Robotify to support students in meeting coding standards for Grades K–8 students. Over the course of the year, 4,535 students used the program and completed an average of 24.2 tasks (all these students also used Imagine Math during the 2022–2023 school year). The purpose of this research study was to examine how usage of Imagine Robotify impacted students' mathematics achievement. As the district did not employ a standardized computer science or coding assessment, Imagine Learning analyzed the New Jersey Student Learning Assessments (NJSLA) mathematics data for the users and correlated outcomes to program usage to determine how students' usage of Imagine Robotify was impacting mathematics performance with the assumption that mathematics might serve as a proxy for coding achievement. This assumption is supported by research that indicates there exists a strong relationship between computer science instruction and mathematics achievement, with time spent on computer science instruction positively impacting students' mathematics achievement (Century et al., 2020; Salac et al., 2021).

### Clifton Public Schools, NJ

Demographics (n = 4,535)	
Special Education Status	17.3%
Free/Reduced Lunch Status	44.6%
ELL	7.8%
Title I Math	30.3%
504 Plan	1.8%

## Methods

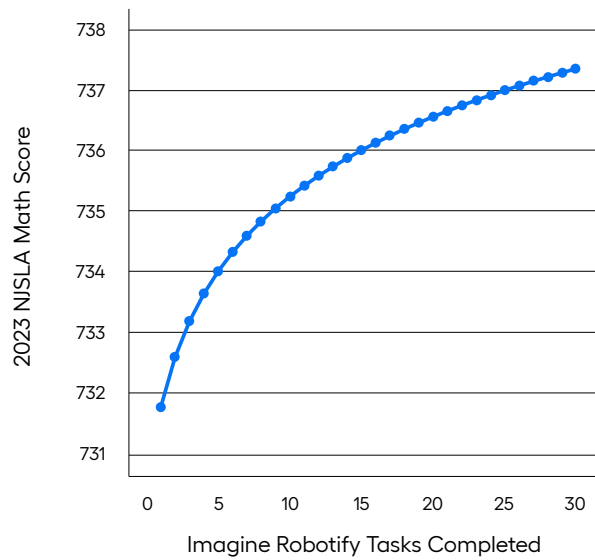
Imagine Learning employed two analytical techniques to understand the relationship between Imagine Robotify usage and students' mathematics achievement as measured by the NJSLA assessment. First, Imagine Learning regressed the number of tasks that students completed within Imagine Robotify against their NJSLA mathematics scores to determine the direction and strength of the relationship between program usage and math achievement. Second, students were categorized into users or non-users based on number of tasks completed within Imagine Robotify and then statistically matched based on baseline scores and demographics using propensity score matching. Then the average NJSLA math scores of each group were compared to better isolate the impact of Imagine Robotify on students' math achievement.

## Results

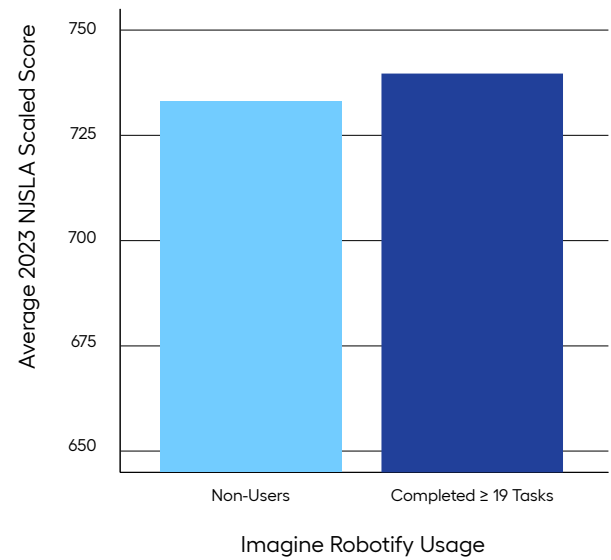
Data from this research study demonstrate positive associations between the use of Imagine Robotify and NJSLA math performance. Particularly, as students completed more tasks in Imagine Robotify, they achieved statistically greater scores on their 2023 NJSLA math assessment ( $p < .01$ , see Figure 1). This indicates that as students spent more time completing tasks in the program, they, on average, achieved greater scores on the NJSLA math assessment. Further, after statistically matching students on baseline scores and demographic variables, results showed that students who completed at least 19 tasks<sup>1</sup> in Imagine Robotify statistically outperformed their peers by about 7 points on the NJSLA math assessment ( $p < .001$ , see Figure 2). This matching analysis provides further proof that when isolating the impact of Imagine Robotify on students' math achievement, we see students who use the Imagine Robotify program achieve greater outcomes on the NJSLA math assessment. Overall, these results indicate that Imagine Robotify is a strong solution for not only developing students' coding skills but also supporting students in their mathematics achievement.

<sup>1</sup>19 represents the median number of tasks completed.

**Figure 1.** Association between tasks completed in Imagine Robotify and 2023 NJSLA Math score.



**Figure 2.** Average 2023 NJSLA math score by Imagine Robotify usage.



## References

- Century, J., Ferris, K. A., & Zuo, H. (2020). Finding time for computer science in the elementary school day: A quasi-experimental study of a transdisciplinary problem-based learning approach. *International Journal of STEM Education*, 7(20). <https://stemeducationjournal.springeropen.com/articles/10.1186/s40594-020-00218-3>
- Salac, J., Thomas, C., Butler, C., & Franklin, D. (2021). Understanding the link between computer science instruction and reading & math performance. In *26th ACM Conference on Innovation and Technology in Computer Science Education V. 1. (ITICSE 2021), June 26-July 1, 2021, Virtual Event, Germany*. ACM, <https://dl.acm.org/doi/pdf/10.1145/3430665.3456313>