California Schools That Use Twig Science Elementary Have Significantly More Students Who Meet California Science Test Standards

Overview

Twig Science Elementary is a phenomena-based core science curriculum that places the power of discovery into students' hands and encourages them to inquire deeply and think critically about science and engineering in the real world. It combines engaging science content with a flexible digital platform to support in-person, hybrid, and virtual-only models.

Twig Science Elementary was utilized by almost 100 school districts in California during the 2021–2022 school year. To investigate the overall efficacy of the Twig Science Elementary curriculum, we evaluated the average performance on the Grade 5 California Science Test (CAST) for schools in districts that used Twig Science Elementary compared to the average performance of schools that did not use Twig Science Elementary.

Results

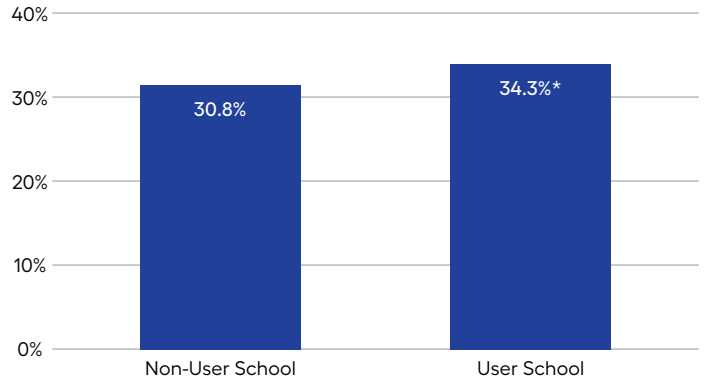
Figure 1 presents the average school-level percentage of students who met or exceeded Grade 5 CAST standards based on Twig Science Elementary user status. A t-test found that California schools that used Twig Science Elementary had a statistically significantly higher proportion of students who met or exceeded Grade 5 CAST standards than California schools that did not use Twig Science Elementary (p-value <0.001). Statistical significance indicates that it is unlikely that the difference in performance between user and non-user districts is due to chance alone. The computed Cohen's d effect size for this comparison was found to be 0.17 which can be considered a medium effect.[1]

An ordinary least squares regression model was used to determine whether a difference in performance could be further demonstrated after controlling for school-level demographics between user and non-user districts. The regression controlled for student demographics including the percent of economically disadvantaged students, percent of English Learner (EL) students, percent of Black/African American students, percent of Hispanic/Latino students, and percent of students that identify as two or more races. See Table 1 for a summary of the demographics of user and non-user schools.

[1] P-value is calculated using a weighted t-test and effect size calculated using Cohen's d. An effect size less than 0.05 is considered small, 0.05 to less than 0.2 is considered medium, and 0.2 or greater is considered large according to Kraft, M.A. (2020). Interpreting effect sizes of education interventions. Educational Research, 49(4), 241–253.

Results indicate that Twig Science Elementary schools still had significantly higher proportions of students who met or exceeded the Grade 5 CAST standard after controlling for these school-level demographics (coefficient on Twig user indicator = 1.5%, *p*-value <0.001).

Figure 1. Average School-Level Percentage of Students Who Met or Exceeded CAST Standards by Twig Science Elementary User Status



Note: *$p < 0.001$

Table 1. Demographics of Non-User and User Schools

	Non-User	User
Number of Schools	5,257	638
Average Number of Grade 5 Students Per School	73	80
Economically Disadvantaged Students	60.8%	57.0%
English Learner Students	20.0%	21.4%
Black/American Students	4.4%	3.7%
Hispanic/Latino Students	56.6%	52.9%
Students Who Identify as 2+ Races	4.4%	4.7%