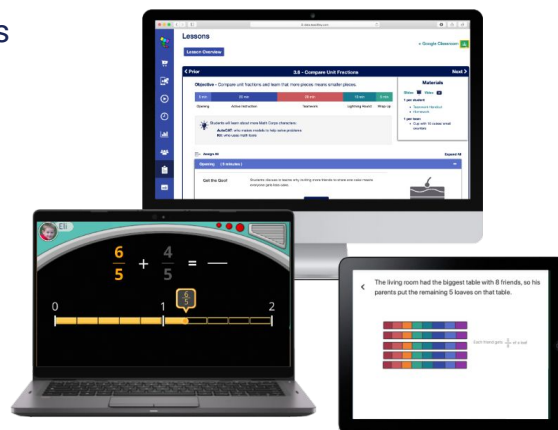


Developed in partnership between Teachley and the Success for All Foundation under a grant from the National Institutes of Health (1R44GM130162) and built on prior grants from the National Science Foundation, the Institute of Education Sciences, and a private foundation, the **Fractions Boost Intervention** is a set of core curriculum units covering the fractions domain for grades three and four.



Game-based Intervention Curriculum

The **Fractions Boost Intervention** combines games, collaboration, and an inquiry approach to make learning more interactive and engaging, while promoting deeper learning of content. The curriculum covers 3rd and 4th grade fractions standards across 16 skill areas, including unit fractions, measurement, part of a whole, equivalence, comparison, adding and subtracting mixed numbers, multiplication of fractions, and more. The intervention includes:

- Inquiry-based hands-on and digital lessons
- Sample class discussions
- Collaborative teamwork
- Adaptive learning games, videos and eBooks
- Problem solving modeling software
- Built-in formative assessment that easily supports differentiated instruction
- Targeted mini-lessons for further remediation
- Optimized for use across device platforms including Chromebook, computers, and iPad.
- Includes home login access.

Research Design

The Center for Research and Reform in Education (CRRE) at Johns Hopkins University initially planned to conduct a randomized evaluation of the intervention during the 2021-22 school year. Given the turbulence that COVID-19 created in school planning and operating, and the need for flexible and adaptable interventions for various school settings (in- person, hybrid, remote), the project team decided to offer the intervention to all recruited schools. The study employed a one-group, pre-post correlational design that sought to address the following research questions:

1. How is the intervention implemented in schools?
2. How does the intervention relate to improved student performance and engagement?
3. What is the role of virtual coaching?

Participants

Participants included 3rd and 4th grade classroom teachers, in addition to two intervention teachers, and their students from 13 schools located across six diverse districts (48 classrooms). The majority of schools have a relatively high representation of students who receive free or reduced-price lunch but otherwise the district demographics are disparate, representing a range of locales and math proficiency. Third grade classrooms make up the majority of the sample (62.5%), with the bulk of students attending in-person classes (70.3%).

Major Findings

- 1. Teachers overwhelmingly agree that using the curriculum enhanced their ability to teach fractions.** Approximately 85% of teachers reported that the curriculum enhanced their ability to teach fractions. Multiple teachers highlighted the engaging, organized, and dynamic nature of the program, with one teacher proclaiming, “It was very comprehensive, including each component of the fractions standards, and it delved deep into each standard, resulting in students needing to use rigor and problem solving.”
- 2. Achievement gains on the fractions assessment were significant for the overall sample but highest for certain student subgroups/classroom settings.** Controlling for setting and district, students in third grade classrooms scored an average of 3.59 points higher at posttest than at pretest ($p < .001$, effect size = +1.40). In fourth grade, students had an average gain of 3.54 points ($p < .001$, effect size = +0.94). Students learning in-person and in a blended model demonstrated greater gains than those learning virtually.
- 3. Teachers find, overall, the digital curriculum was feasible to implement.** The majority of teachers expressed that most of the technology components were extremely feasible to implement with some finding it difficult to use the problem-solving software and reporting.
- 4. Overall, students and classrooms who progressed further in the curriculum demonstrated greater fraction knowledge gains.** Students completing more of the intervention was associated with achievement gains in both third and fourth grade. However, these results were difficult to interpret with confidence because other factors may have contributed to the differences.
- 5. Multiple data sources indicated that many schools were able to adapt it to fit a myriad of configurations, with certain components proving particularly valuable.** Given the nature of learning in the time of COVID-19, implementation varied across classrooms. Teachers identified shortened mathematics blocks as barriers to full implementation. However, most teachers were able to successfully adapt the program to their needs, with the fractions games, teamwork, and get the goof identified as the most valuable program components.