The Impact of a Virtual Coaching Program to Improve Instructional Alignment to State Standards

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Between 2007 and 2015, all 50 states and the District of Columbia adopted so-called "college- and career-readiness (CCR) standards" in math and English language arts (ELA) as part of the latest wave of standards-based reform. The new standards called for intellectually more ambitious instruction and raised expectations for what students should know and be able to do. To support teachers' implementation of CCR standards, the Center on Standards, Alignment, Instruction, and Learning (C-SAIL), funded by the Institute of Education Sciences at the U.S. Department of Education, developed the Feedback on Alignment and Support for Teachers (FAST) program. FAST is a virtual coaching program designed to help teachers better align their instruction to their new state standards and foster learning for all students, including English learners (ELs) and students with disabilities (SWDs).

During the 2016–17 school year, a research team at the American Institutes for Research (a C-SAIL partner) piloted the initial version of the FAST program in two schools. Informed by the pilot, the team modified the FAST program. In the 2017–18 and 2018–19 school years, the team conducted a multisite school-level randomized controlled trial to test the impact of the modified program, focusing on Grade 4 math and Grade 5 ELA. This brief describes the key components of the FAST program and the impact study design, presents results, and discusses study limitations and possible explanations for the results.

FAST Program Components

The FAST program, designed to be implemented virtually, includes four key components:

1. **Collaborative academic study team (CAST) meetings.** During the CAST meetings, school-based, grade-level teams meet with their FAST math or ELA coach to gain a better understanding of their state's standards and features of instruction that align to

The FAST Framework for Alignment

The FAST Framework for Alignment describes the content of instruction and state standards using a framework based on topics (e.g., equivalent fractions, adding whole numbers) paired with cognitive demands (e.g., demonstrate understanding, performing procedures). Alignment is assessed by comparing the topic and cognitive demand pairs describing the content of instruction and the pairs describing the relevant standards.

those standards.[1] Together, they identify the standards that will be addressed in upcoming lessons, discuss how those standards relate to the standards addressed in previous and later grades, consider features of instruction that align to the state standards by reviewing publicly available video recordings of instruction, and examine FAST resources that can be used to support aligned instruction for all students, including specific resources for supporting ELs and SWDs. Discussions of the content of the standards and instructional alignment are grounded in the FAST Framework for Alignment, which is based on the Surveys of Enacted Curriculum (SEC).[2]

2. **Individual coaching sessions.** During the individual coaching sessions, a teacher and their FAST coach discuss the extent to which the content of the teacher's instruction aligns to their state standards and identify actionable next steps to strengthen alignment. The teacher and the coach use the FAST Framework for Alignment to look closely at the topics addressed in a recent lesson as well as the level of cognitive demands emphasized during instruction and discuss ways to support all students in mastering the standards.

3. **Instructional logs and video recordings of teachers' own instruction.** The instructional logs are used during the individual coaching sessions to reflect on the content of instruction over a certain period of time. When completing instructional logs on the FAST online portal, teachers provide information on the extent to which their instruction emphasized specific math or ELA topics and cognitive demands from the FAST Framework for Alignment. As soon as teachers finish an instructional log, they can view a representation of their reported instruction in the form of a color map generated by the online portal alongside a representation of their state standards (see Exhibit 1 for a sample color map).

   The video recordings of teachers' instruction complement the information in the instructional logs by providing an opportunity for teachers to watch their own instruction and, with the support of their FAST coach, reflect on areas of strength and weakness in their instruction. When teachers complete a video recording, they enter information about the recorded lesson into the online portal. After reviewing the video, FAST coaches select a few short video clips and use the selected clips to support teachers' reflection on their instructional alignment to state standards during the individual coaching sessions.

4. **Resources that offer models of aligned instruction.** The FAST online portal also includes a library of free resources designed to help teachers better understand their state standards, align instruction to state standards, and support ELs and SWDs to understand the content in the standards. The library includes example lesson plans, lesson activities, videos of aligned instruction, and strategies for supporting student work with grade-level materials. FAST coaches utilize the library of resources as needed to facilitate the CAST meetings and individual coaching sessions.

[1] The FAST coaches are experts in math or ELA and were hired by the study team from a national pool of coaches.
[2] Porter, A. C., McMaken, J., Hwang, H., & Yang, R. (2011). Common core standards: The new U.S. intended curriculum. *Educational Researcher, 40*(3), 103–116. https://doi.org/10.3102/ 0013189X11405038

Each year, teachers are expected to complete five 60-minute CAST meetings, five 60-minute individual coaching sessions, five instructional logs, and five video recordings of a complete lesson from their instruction.

Exhibit 1. A Sample Color Map Illustrating the Alignment Between a Math Teacher's Instruction With State Standards

Instruction (over 33 days)					Topic Categories	Target (over 170 days)				
Total	Recall/Perform Procedures	Demonstrate/ Communicate Understanding	Justify/Evaluate/Generalize	Solve and Interpret Findings from Word Problems		Recall/Perform Procedures	Demonstrate/ Communicate Understanding	Justify/Evaluate/Generalize	Solve and Interpret Findings from Word Problems	Total
14.11	4.98	4.15	2.49	2.49	Number Concepts	3.20	4.80	0.00	0.00	**8.00**
42.74	11.62	11.62	9.96	9.54	Number Properties and Relationships	4.00	11.20	4.80	0.00	**20.00**
9.12	6.22	1.24	0.83	0.83	Whole Number/Decimal Operations	4.00	4.80	1.60	3.20	**13.60**
0.00	0.00	0.00	0.00	0.00	Fraction Operations	2.40	4.00	0.00	4.00	**10.40**
34.02	9.54	9.13	8.30	7.05	Models and Representations	2.40	21.60	0.00	0.00	**24.00**
0.00	0.00	0.00	0.00	0.00	Measures	2.40	1.60	0.00	1.60	**5.60**
0.00	0.00	0.00	0.00	0.00	Measurement Relationships and Operations	1.60	1.60	0.00	2.40	**5.60**
0.00	0.00	0.00	0.00	0.00	Geometric Concepts	8.00	4.00	0.80	0.00	**12.80**
0.00	0.00	0.00	0.00	0.00	Finance	0.00	0.00	0.00	0.00	**0.00**
	32.36	**26.14**	**21.58**	**19.91**	**Total**	**28.00**	**53.60**	**7.20**	**11.20**	

Legend

0 - >1 | 1 - >2 | 2 - >4 | 4 - >8 | > 8

NOTE: The sample map features two grids. The left grid represents a teacher's reported instruction during a specific log period (i.e., the first 33 days of the 170 days in the school year in this case). The right grid represents the state standards. In both grids, topics are represented in the rows, and the cognitive demands are represented in the columns. Each cell in the left grid shows the percentage of instruction dedicated to a given topic and cognitive demand pair, as reported by the teacher. Each cell in the right grid shows the percentage of the content of the standards dedicated to a given topic and cognitive demand pair, as determined by expert coding.

The darker the cell, the more emphasis on the specific topic and cognitive demand pair in the reported instruction or the state standards. Teachers and FAST coaches reflect on instructional alignment by comparing the color patterns of the two grids.

Impact Study Design

We assessed the impact of the FAST program on teachers' instruction and students' achievement through a multisite school-level randomized controlled trial, which took place in 56 elementary schools spanning three urban districts and two rural districts across three states.[3] Exhibit 2 presents the study research questions, as well as information about the data that we collected during the baseline year (2016–17) and the 2 intervention years (2017–18 and 2018–19).

We estimated the impact of the intervention on teachers' instruction and student achievement after the first year of implementation, as well as after the second year. In this report, we focus on the results at the end of the second year—after the completion of the 2-year intervention.[4]

Exhibit 2. Data Sources, Types of Data Collected, and Data Collection Plan for the FAST Impact Study, by Research Question

Research Question	Data Source	Types of Data Collected	Data Collection Plan
1. To what extent was the FAST program implemented as planned?	FAST program artifacts	FAST attendance sheets, coaching logs documenting activities in coach sessions, teacher instructional logs, video recordings of teachers' instruction	Collected for participating treatment teachers during each intervention year
	Teacher survey	Information on teachers' background and professional development activities in each intervention year	Administered to study teachers at the end of each intervention year
2. Did the FAST program lead to greater alignment of teachers' content coverage with state standards?	Instructional Survey, which was based on the SEC	Information on the content of teachers' instruction in the baseline year and in each intervention year.	Administered to study teachers in fall of the baseline year and at the end of each intervention year
3. Did the FAST program lead to increased student achievement as measured by state assessments?	Student administrative records	Student demographic information and state test scores	Collected for the baseline year and each intervention year

[3] We randomly assigned 29 of the 56 study schools to the treatment condition and 27 to the control condition within 11 random assignment blocks formed within the five study districts. Prior to random assignment, some schools indicated that they wanted to participate in either the math or ELA component of the study, but not both. As a result, the sample for the math component of the study included 28 treatment schools and 27 control schools, and the sample for the ELA component of the study included 28 treatment schools and 24 control schools.

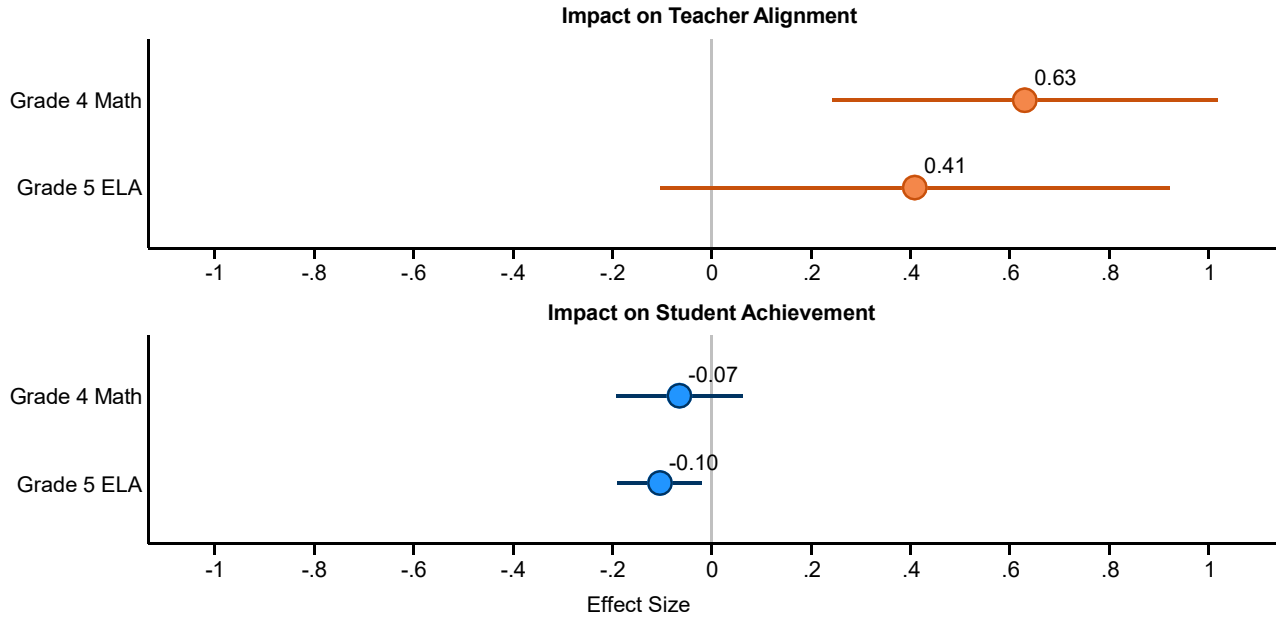
[4] To estimate the impact of the FAST program, we conducted intent-to-treat analyses using multilevel models that accounted for the nested data structure. Our analyses of the impact of the FAST program on teachers' instructional alignment included regular Grade 4 math and Grade 5 ELA teachers who were present in study schools and had instructional survey data in the spring of each intervention year. Our analyses of the intervention's impact on student achievement included students who were present in the classrooms taught by all Grade 4 math and Grade 5 ELA teachers in study schools in the spring of each intervention year, regardless of whether the relevant teacher instructional survey data are available.

Results

Overall, 64% of math teachers and 69% of ELA teachers in the treatment group of our teacher sample completed at least one FAST activity over the course of the 2 intervention years. (See Footnote 4 for sample definitions.) These teachers completed approximately half of the planned FAST activities on average and had overwhelmingly positive perceptions of the FAST program.

Despite the lower-than-expected FAST participation rate among treatment teachers, the FAST program had positive effects on teachers' instructional alignment for both Grade 4 math and Grade 5 ELA in the second intervention year (effect sizes = 0.63 and 0.41, respectively),[5] although only the effect for math was statistically significant ($p < .01$) (see top panel of Exhibit 3). Contrary to our expectation, however, the FAST program had negative effects on student achievement in both math and ELA at the end of the second intervention year (effect sizes = -0.07 and -0.10, respectively), although the effect was statistically significant only for ELA ($p < .05$) (see bottom panel of Exhibit 3).[6]

Exhibit 3. Effect Sizes for the Impact of the FAST Program on Instructional Alignment and Student Achievement, by Subject



NOTE: The exhibit shows the effect sizes for the estimated impact of the FAST program on instructional alignment and student achievement for Grade 4 math and Grade 5 ELA, along with the 95% confidence interval surrounding each effect size.

[5] For each outcome measure, we computed the effect size corresponding to the impact estimate as a standardized group mean difference (i.e., the estimated group mean difference divided by the pooled within-group standard deviation of the outcome measure).
[6] Year 1 effects of the FAST program on instructional alignment and student achievement were somewhat smaller than the Year 2 effects, and only the Year 1 effect on instructional alignment for Grade 4 math was statistically significant ($p < .01$).

Study Limitations

Although the study is based on a rigorous experimental design, some limitations should be considered when interpreting the results. First, the study relied on a purposively selected sample of schools, half of which are located in a single district. Studies of the FAST program conducted in different settings may produce different results. Second, the rate of uptake of the FAST program was lower than intended. We do not know what the results might have been had treatment teachers participated in the full set of planned FAST activities. Finally, the study relied exclusively on teachers' self-report to assess teachers' instructional alignment with state standards. We do not have observational data on teachers' instruction that may allow us to create more reliable measures of instructional alignment or measure other important aspects of instructional quality.

Potential Explanations for Study Findings

Why did the FAST program have a positive effect on instructional alignment but not on student achievement? One potential explanation may be that instructional alignment with state standards is not (strongly) associated with student achievement.[7] Thus, there may be a weak or broken link in the pathway from the FAST program to student achievement. Another explanation may be that the state tests were not sensitive to the effects on student achievement from improvement in teachers' instructional alignment with their state standards. Treatment teachers, for example, may have put more emphasis on higher levels of cognitive demand for certain topics as required by the state standards, but the state test may not have been able to detect this difference in emphasis. A third explanation may be that improving instructional alignment is necessary, but not sufficient, for improving student achievement. In addition to improving instructional alignment, for example, teachers may also need to improve other aspects of their instruction (e.g., their use of questions and facilitation of whole-group discussions). Finally, a fourth explanation may be that teachers needed more support in using what they learned from the FAST program in the context of the curricular materials with which they were working. The FAST program supported teachers in better understanding their state standards and reflecting on the extent to which their instruction was aligned to those standards, but it did not explicitly support them in using their curricular materials to design lessons that were aligned to the state standards.

[7] As part of the larger study, we examined the relationship between teachers' instructional alignment and teachers' contribution to student achievement growth (value-added) and did not find a significant relationship between overall alignment and value-added in either math or ELA.

Conclusion

This study produced promising evidence that a virtual coaching program can have a positive impact on teachers' instructional alignment, but it did not produce evidence for a positive impact of the coaching program on student achievement in math or ELA. There are a number of potential explanations for the findings from this study. However, more work is needed to gain a clearer understanding about the potential of improving instructional alignment as a way to boost student achievement and about the conditions under which such potential, if any, can be fully achieved.

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