An Evaluation of Reading Apprenticeship in Science Classrooms During COVID 19

Michaela Gulemetova, Robyn Elkins, Raquel Sanchez, Ilana Barach, Vincent Chan, Megha Joshi

Introduction

WestEd developed the Reading Apprenticeship professional development framework to improve literacy instruction across the academic disciplines. The approach, which uses inquiry to help teachers understand their role in teaching literacy skills, has been tested with math, science, language arts, and history teachers in middle and high school, and multiple studies have shown its effectiveness (Greenleaf et al., 2009; Greenleaf et al., 2011a; Greenleaf et al., 2011b; Kemple et al., 2008).

The Supporting Effective Teaching with Disciplinary Inquiry (SETDI) project used a blended version of Reading Apprenticeship, combining both in-person and online professional development, to improve teacher literacy instruction and student learning. The SETDI project provided 1,500 middle and high school teachers with professional learning and support over 2 school years in Arizona, California, Michigan, New York, Texas, Washington, and Wisconsin with funding from a 3-year grant from the U.S. Department of Education's Supporting Effective Educator Development (SEED) program.

Key Implementation Findings

- Teachers found the in-person sessions to be the most helpful aspect of the model while school team meetings to be the most useful aspect of the support they received.
- The Teacher Leader role is a crucial element of the Reading Apprenticeship framework.
- Teachers faced challenges implementing Reading Apprenticeship during virtual instruction, but some factors supported implementation during virtual learning.
- Overall, fidelity of implementation for the study was low.

Key Impact Findings

- Reading Apprenticeship showed some large positive significant effects on teacher practices early on during the study, and some of these impacts persisted over time. Specifically, teachers assigned a wide range of text genres and provided supplementary materials to engage students in reading about science topics. Teachers also engaged students in more frequent conversations about their reading and thinking processes.
- No effects on student outcomes were detected.

The American Institutes for Research® (AIR®) evaluated the impact of SETDI's effectiveness on teacher and student outcomes in science classrooms. The study included about 100 teachers from 50 middle schools and high schools in California and Texas. As part of the study, we assessed implementation fidelity and examined facilitators and barriers to implementation. We provided formative feedback to WestEd on teacher training in and implementation of Reading Apprenticeship strategies. This feedback will support continuous improvement of new program elements implemented through this SEED grant.

Considering the implementation time frame for the project (2019–22), it is important to note that the COVID-19 pandemic created a unique challenge for schools and interfered with the experimental design of this evaluation. However, programs always face implementation challenges of some kind. The COVID-19 crisis introduced the question of whether a validated program like Reading Apprenticeship can benefit students and teachers under extremely challenging circumstances. Of particular interest to the field is how the program might be adapted to virtual learning environments.

Overview of Reading Apprenticeship

The Reading Apprenticeship framework is designed to improve student literacy and learning across four interacting dimensions of a learning culture: social, personal, cognitive, and knowledge-building (Figure 1). When teachers use Reading Apprenticeship literacy routines with their students, they transform their classrooms into engaging, collaborative learning spaces. These routines place academic texts at the center of learning activities. Students work together to make meaning of texts through metacognitive conversations. These conversations, which help make thinking visible and encourage students to explore their own thinking processes, are supported with specific routines that reflect the instructional framework's four dimensions.

Students practice self-reflection in small groups to understand how they learn. They discuss their processes, strengths, and weaknesses as readers and learn from one another. Teachers create the space for these discussions by offering more in-class opportunities for reading.

The word "Apprenticeship" in the program's name reflects its emphasis on helping teachers to recognize their own literacy skills and to apprentice students into the ways of reading, writing, thinking, talking, and reasoning in their fields. Reading Apprenticeship teachers participate in carefully designed cycles of inquiry. These cycles mirror the routines they will use in the classroom with their students. Through these cycles, teachers discuss their own literacy skills with their peers and identify new approaches to teaching those skills.

Within each school, teacher teams select a Teacher Leader who holds monthly school team meetings. Teacher Leaders attend four regional Teacher Leader Meetings to learn how best to support their school teams. School principals also have a role in supporting their school teams by ensuring that teachers have adequate time for professional learning and collaboration. The SETDI project also included Regional Partners from local education organizations to support teacher practice and school uptake as well as to help sustain the program.

Figure 1. The Reading Apprenticeship Framework

Note. Image from WestEd's Reading Apprenticeship website (https://readingapprenticeship.org/wp-content/uploads/2023/08/Dimensions-2023.pdf).

The SETDI Model

Because of the COVID-19 pandemic, the two cohorts of teachers in this study received two versions of the Reading Apprenticeship program (Figure 2).

Figure 2. Study Timeline
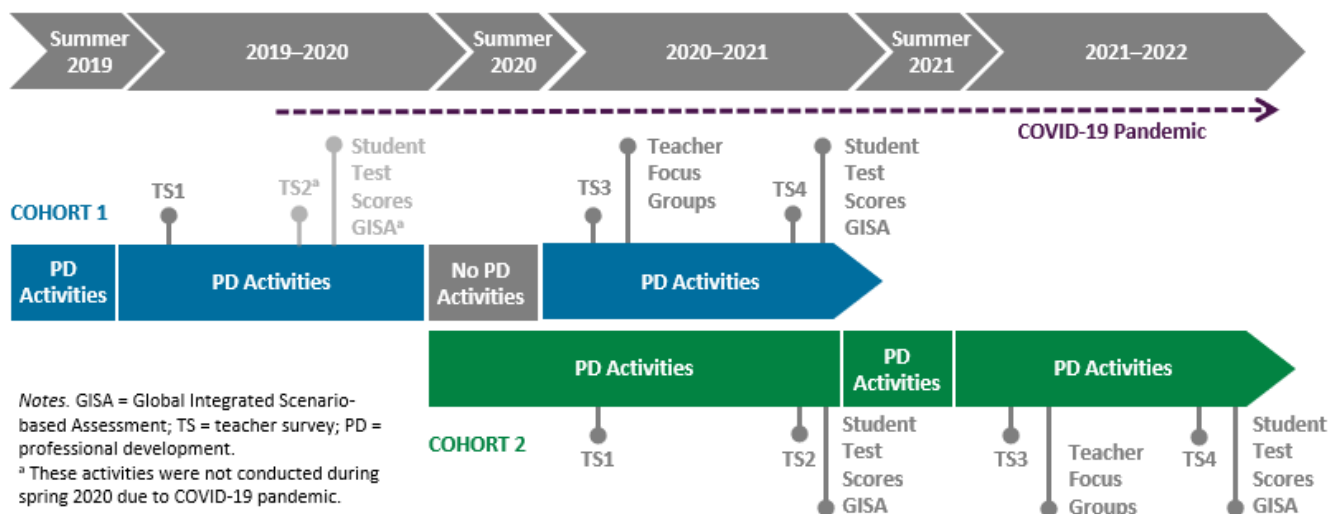
The first cohort received the professional development as originally planned, and the second cohort received a modified version that was conducted online. Cohort 1 teachers participated in 5 days of in-person professional development training during the summer and winter of the 2019–20 school year. Cohort 1 also received support from their Teacher Leader over 2 years. This support included online professional learning community (PLC) meetings and monthly school-based team meetings.

Cohort 2 teachers received a combination of 15 synchronous and asynchronous online modules covering the content of the in-person professional development during summer 2020, the 2020–21 school year, and summer 2021. Cohort 2 teachers also were offered office hours and professional development sessions during the second year as an extension of the Reading Apprenticeship professional development. This modified version of professional development did not include Teacher Leaders, PLCs, or school team meetings.

Research Design

The evaluation used a mixed-methods approach, including an impact and an implementation study. The impact study measured the effectiveness of the SETDI model on teachers' classroom practices, student science literacy, and student achievement. The implementation study measured the fidelity of implementation (how much of the program teachers received) and teachers' experience of the program.

1. **We randomly assigned 50 middle and high schools** to either a treatment group (27 schools) that received the SETDI model, or a control group (23 schools) that received delayed professional development. Grade 8, 9, or 10 science teachers recruited from treatment schools received the SETDI model (Cohort 1 during 2019–21 and Cohort 2 during 2020–22). Control schools conducted business as usual during the study period. AIR collected 2 years of data from all the study schools.
2. Because the two cohorts received different versions of Reading Apprenticeship, we used **an intent-to-treat approach**. This approach captures the effects of the intervention as actually delivered and experienced by all participating teachers, even those who did not participate fully or who dropped out.
3. **Data sources** included teacher surveys (two per year, fall and spring), an assessment of student science literacy skills (once per year, spring), professional development attendance records, school district student records, and teacher focus group discussions.

Key Implementation Findings

Cohort 1 teachers found the in-person sessions to be the most helpful aspect of the model. Cohort 2 teachers gave some positive feedback on the online modules that replaced the in-person sessions. However, only a very small number of these teachers completed all modules.

"I loved the Summer Institute last year; I thought it was fantastic. Just a whole different approach to reading and bringing that into science. I thought that was pretty cool. Similarly, about the winter training."

The Teacher Leader role is a crucial element of the Reading Apprenticeship program. The lack of the Teacher Leader element for Cohort 2, due to the COVID-19 pandemic, was associated with substantially less school-based support for implementation for that cohort.

"I am not currently able to have small groups or partner conversations in our live (online) class settings. I had to alter everything about the way I teach to fit this restriction; however, when we go back into the classrooms, we won't be able to do this [small groups] either."

For Cohort 1 teachers, the school team meetings seemed to be the most useful aspect of the support they received. Due to COVID-19, Cohort 2 teachers did not have this opportunity.

Both cohorts of teachers faced challenges implementing Reading Apprenticeship during virtual instruction. The two most common challenges were lack of student engagement and teachers needing to learn how to teach remotely.

Some factors supported implementation during virtual learning. The main factor supporting implementation was the alignment of Reading Apprenticeship with the state content standards.

Overall, fidelity of implementation for the study was low. Cohort 1 teachers and schools were on track to meet the fidelity thresholds during the 2019–20 school year. School closures and the switch to distance learning resulted in low rates of fidelity at both the teacher and school levels (Figure 3).

Figure 3. Percentage of Schools Implementing Reading Apprenticeship with Fidelity
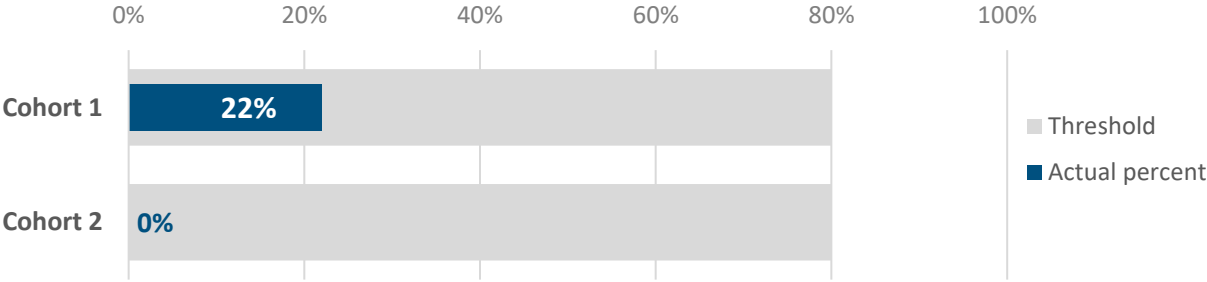

Key Impact Findings on Teacher and Student Outcomes

Reading Apprenticeship showed some large positive significant effects on teacher practices early on during the study, and some of these impacts persisted over time. When compared to the control group, more treatment group teachers assigned a wide range of text genres and provided supplementary materials to engage students in reading about science topics. Treatment teachers also provided students with more frequent opportunities for in-class reading and they assigned more reading.

In Year 1, treatment teachers also engaged students in more frequent conversations about their reading and thinking processes. However, this positive effect did not persist into Year 2 (Figure 4).

Figure 4. Teacher Impact Estimates Over Time
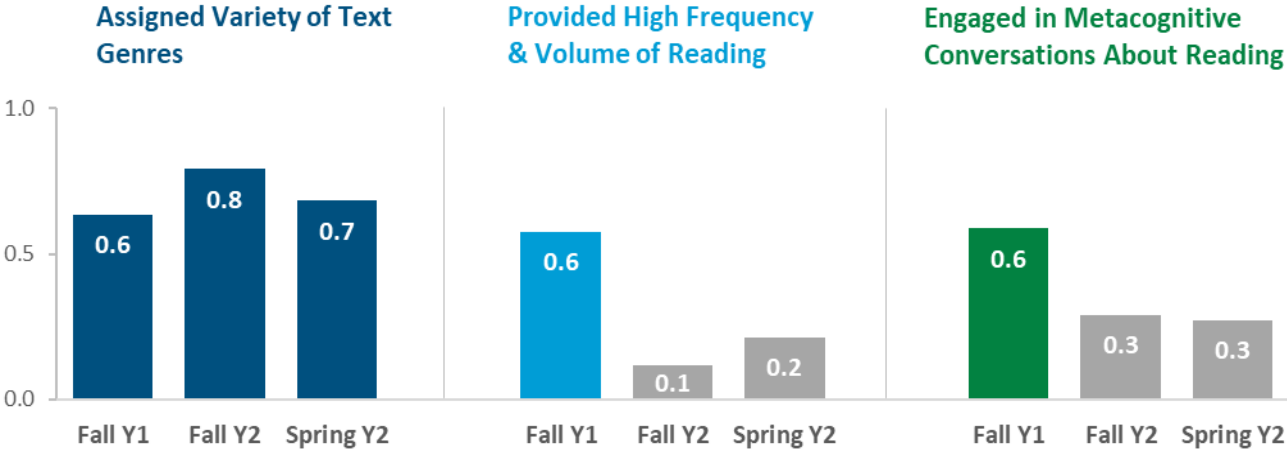
Note. Grey bars indicate that the effect was not significant at *p* < .05.

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No effects on student outcomes were detected. The SETDI model did not produce significant effects on student science reading comprehension, science background knowledge, or English language arts achievement over 2 years. In other words, on average, students from treatment schools and students from control schools had very similar levels of literacy and achievement by the end of this study.

Implications for Future Research

The SETDI study examined a unique implementation of Reading Apprenticeship during the COVID 19 pandemic. Our data show some large positive significant effects on teacher practices, some of which persisted over time. However, the study showed no significant effects of the Reading Apprenticeship practices on student outcomes when compared with control groups.

The results from this study point to several areas in need for further investigation. Specifically, a replication study is needed to validly test the 5-day professional development model under normal (nonemergency) school conditions. The field would also benefit from testing the potential of the online modules created by WestEd. A hybrid model of Reading Apprenticeship that combines the online modules with in-person support has scale-up potential.

In addition, a study focusing on the role of Reading Apprenticeship Teacher Leaders would help inform the field about how to create and support a literacy-focused community of practice among secondary teachers from all content areas. Finally, research is needed on how teachers apply the framework in distance learning and hybrid learning environments, and how literacy itself is changing in an increasingly digital world. Overall, the study findings demonstrate the potential to adapt the Reading Apprenticeship program to digital learning environments.

The full report can be found at: https://www.air.org/project/reading-apprenticeship-evaluation.

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