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Fable Writer Phase 2 SBIR Study
Final Report
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Prepared by

Education Development Center, Inc. | Center for Children and Technology

Submitted to

Isabella Products · Fable Learning

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EXECUTIVE SUMMARY

Introduction

Fable Writer is an online reading, writing and research tool designed to facilitate synchronous, collaborative writing tool that enables learners to read and copy text and images from teacher-curated books and Web-based resources in the *Fable Reader* digital library. The *Fable Writer* project addressed two essential activities in primary and secondary education, and in society more broadly: writing and collaboration. Writing well and working collaboratively and generatively in teams are skills that increasingly cut across job functions in the American workplace and are essential to success in college. *Fable* tools—*Reader, Writer,* and the accompanying classroom lesson plans—provide unique opportunities for elementary and middle school students to practice researching and writing together as they plan, draft, and submit writing pieces in a safe and closed online environment.

The project's theory of action posited that by working on a shared problem, such as producing an essay to persuade an audience, students will have more opportunities to engage in mutual decision-making about how to produce strong writing that uses document-based evidence effectively. Thus, students have opportunities to engage in content-specific writing tasks that draw on their work with nonfiction texts; build on the writing and communication skills that are central to both Common Core English Language Arts and content area standards and to the communication and collaboration skills called out in the *Framework for 21st Century Learning*; and draw on the benefits that collaboration can bring to writing experiences.

Collaborative group learning has been shown to be a highly effective teaching strategy for improving student learning outcomes. Some research-based evidence indicates that when students work in pairs, collaborative writing can have a strong impact on the quality of the writing. In addition, there is evidence that students in writing pairs show higher self-esteem as writers. *The current study examined whether and how an "all in one" digital tool can facilitate similar interactivity among elementary and middle school students.*

Study Overview

For the purposes of this study, *collaborative writing* was defined as "an iterative and social process that involves a team focused on a common objective that negotiates, coordinates, and communicates during the creation of a common document" (Lowry, Curtis, & Lowry, 2004, p. 72).

In February–May 2016, Education Development Center, Inc.'s Center for Children and Technology (EDC) led an exploratory classroom implementation study of the *Fable*

Writer digital tool in four public schools in New York State, Connecticut, and California. The study included 266 students in 12 classes in grades 3 and 6–8. *The primary purpose of this work was to investigate whether using a collaborative writing tool with elementary and middle school-age students would help them produce stronger informational (for elementary school students) and argumentative (for middle school students) writing pieces, as compared to peers in the same school who used the* Fable Reader *digital library and* Reader *tools without the additional writing functionality.*

We conducted a two-group comparison study to examine the impact of the *Fable Reader* and *Writer* tools on elementary and middle school students' writing and collaboration skills by randomly assigning each teacher into one of two conditions: *Fable Reader + Writer* (*FW*) and *Fable Reader*-only (*FR*).

Research Questions

Primary questions

1. Do students who use *Fable Writer* produce collaboratively written products that demonstrate specific writing skills more frequently than students without access to *Fable Writer*?
    a. Do outcomes differ for students in schools where academic achievement in reading and writing is low?
2. Do students who use *Fable Writer* engage in behaviors that support collaborating on a writing task more frequently than students who do not use *Fable Writer*?

Secondary questions

3. How do teachers report that *Fable Writer* impacts their instructional practices regarding research, writing, and collaboration?
4. How do teachers report that *Fable Writer* impacts their perceptions of technology, writing, and collaboration?
5. How do teachers report that *Fable Writer* impacts students' perceptions of collaboration and collaborative writing?
6. How do teachers report that *Fable Writer*'s teacher supports impact their implementation of collaborative research and writing?

Methods

- Four public schools in California, Connecticut, and New York State participated in the study. The schools represented a range of socioeconomic and ethnic diversity.

- Twelve classroom teachers and 266 students (156 boys and 110 girls) in grades 3 and 6–8 participated. One school had mixed-age classes of sixth- through eighth-graders; the other three had grade 3 or grade 7 classes exclusively.
- Each school participated for between two weeks (on a block schedule) to three months, with two study conditions in each school: one or two classes that used *Fable Writer* and *Reader (FW)*, and one class that used *Fable Reader (FR)* only.
- Students in treatment condition classrooms used the *Fable Reader* and *Writer* tools, while students in the comparison condition classrooms used only *Fable Reader*, plus any "business as usual" writing tools (e.g., Google Docs, Microsoft Word, paper-based student writing notebooks) the teacher might typically use.
- Each grade received its own mini-unit of lessons and activities, with slight modifications between the *FW* and *FR* versions. Third-graders were tasked with writing an informational report about animal adaptations, and seventh-graders were required to write a proposal (a form of argumentative writing) to NASA about the benefits and drawbacks of different forms of mining in space. All students could use e-books and pre-approved Web pages from the *Fable Reader* library.
- In both study conditions, students worked in teams of three to five to draft, edit, and write a product for submission to their teachers.
- All teachers participated in a 60- or 90-minute webinar before implementation. Teachers walked through the *Fable* tools with a member of the Fable staff and were able to ask questions about the project objectives.

Findings

Limitations

The study findings should be read in light of four limitations that significantly affected classroom implementation of the *Fable* tools during the study: (1) significant technical difficulties associated with the *Fable* tools (e.g., logging in and bugs in core functionality) or school network infrastructure (e.g., slow rendering time for images); (2) the unexpectedly long time it took to implement the mini-units; (3) students' preparedness to work with the focal literacy activities; and (4) the small sample size. Given the relatively small number of teachers in each grade, the teacher effects (e.g., teaching style and use of technology) overwhelm any effects that we might have identified based on technology use.

Main findings

1. All 12 teachers said that they would use the *Fable* tools again in the future because they saw the value of teaching their students to generate ideas, negotiate, compromise, and express <<their final?>>ideas together. They also realized how challenging it is to establish routines for facilitating such activities.
2. The "all in one" quality of the *Fable* digital tools appealed to most teachers because it could lessen distraction by competing online sites, minimize the risks of visiting developmentally inappropriate websites, and allow teachers to have their students focus on a select set of resources. Teachers remarked that the convenience of having research materials (i.e., the materials in the *Fable Reader* library) and a writing tool together, in one online location, had the potential to make future instruction easier because teachers and students might spend less time switching between technologies, or searching for resources from different locations on the Web.
3. About half the teachers did not feel prepared to guide their students through collaboration routines for this type of work and indicated that they need professional development (PD) and scaffolded student materials to help them lead group collaboration activities.
4. There were three primary challenges to implementation of the *Fable* technology and materials: (1) the need for existing literacy skills required to complete challenging assignments, (2) students' and teachers' relative lack of experience with and opportunities to practice the social-emotional skills necessary to create writing products together, and (3) the need for scaffolded student materials to support collaboration among students. A secondary challenge was the many technical difficulties that students and teachers encountered when working with the *Fable* tools.
5. Grades 6–8 students tended to be less enthusiastic than the elementary school students about writing together, but the students who used *Fable Writer* liked collaborating more than the students who worked only with the *Reader*, suggesting that the *Writer* contributed to students' appreciation for collaboration. However, there were several instances in which an individual middle school student departed from the *FW* group to complete his or her work independently because of frustration with group processes.
6. Even though a majority of third grade students indicated that they liked writing together, we observed several instances in which individuals and whole groups of students were frustrated because they could not agree about what to write or how to assign different responsibilities. Three of the third grade teachers

thought that, from a developmental perspective, collaboration was very challenging for students at this age.

7. Individual teachers' practices were the most significant factor in influencing students' collaboration routines and writing products, rather than any particular features of the *Fable* technologies. Those teachers who had more experience with paired writing routines and/or discussion routines (e.g., "turn and talk" or "think-pair-share") were more successful in leading the *Fable* activities.

Secondary findings

1. Student essays in the *FW* condition at two of the four schools received higher scores than the essays of peers in the *FR* condition. The *FR* essays received higher scores than the *FW* essays at the other two schools.
2. The two schools with higher scores among the *FW* groups—Hamilton (grade 3) and Blue Springs (grades 6–8)—are "low achieving" in reading and writing, as determined by state measures.
3. Students in third grade classes exhibited a greater number of behaviors related to collaborative writing than did seventh grade students. We observed most of these behaviors in the third grade *FW* classes.
4. None of the teachers reported any significant changes to their existing teaching practices based on their experiences during the study.
5. Nearly all the teachers mentioned student access to the *Fable Learning* library and the *Reader* functionality as the most compelling features of the technology. Because most teachers and students encountered challenges with the *Writer*, fewer referenced its features positively, in part because they did not have regular opportunities to use them.
6. Most teachers felt prepared to use the *Fable* technology with their students, but many reported that they were not adequately prepared to teach the mini-units or to help their students write collaboratively.
7. Almost all of the teachers said that they would be interested in additional professional development to prepare them to teach their students to work collaboratively on projects.

Key Recommendations

1. Expand professional development offerings on collaboration routines and literacy skills.

- Many teachers felt inadequately prepared to help their students integrate the literacy and social-emotional skills necessary for engaging in collaborative writing. Fable might consider creating shorter, more focused lessons than the existing mini-units to help teachers and students practice these routines without necessarily engaging with large amounts of content.
- Future professional development offerings could model the types of routines that will help students work together to (1) identify topics of interest, (2) plan for research in the *Fable Learning* library, (3) divide work among themselves, (4) respectfully discuss findings and alternative points of view, (5) resolve disputes and compromise on final writing products, and (6) integrate one another's ideas—or fully justify reasons for excluding them—in the final Document. Helping students to internalize these routines would likely lead to fewer instances of students leaving their groups to complete work individually.
- Additional professional development could also strengthen teachers' abilities to build certain literacy skills among their students, such as identifying claims and evidence in written work, distinguishing between primary and secondary ideas, and identifying relevant ideas across multiple resources, such as websites, videos, and written documents.

2. Provide more student scaffolding for collaboration routines.

- Several teachers requested scaffolding (i.e., worksheets, graphic organizers, and numbered tasks for students) to help students practice the collaboration routines we discussed above. Many of these scaffolds could be integrated into *Fable Writer* to help students as they work with this digital tool.
- The scaffolds might include built-in prompts for students to stop periodically to discuss their work with one another; checklists for students to use as reminders of the different tasks and routines for which they are responsible during collaboration and writing; and general guidance on best practices for collaborative work, such as how to acknowledge one another's ideas, how to integrate multiple ideas into themes, and how to compromise in order to produce final writing products.
- Many teachers commented that they liked the checklists that are already included in the teaching materials. Those checklists could be adapted to fit different teachers' and students' needs (e.g., simplified checklists for younger students) and made available to students from within the Thinking Space and the Document (i.e., the two main collaborative writing screens within *Fable Writer)* so students can remind themselves of their responsibilities.

3. Improve teacher–facing functionality around collaboration routines and student work.

- The current version of the *Writer* tool has limited functionality for teachers. Providing the scaffolds listed above for teacher-facing materials will help teachers engage their students in better collaborative experiences.
- Fable might also consider building in additional prompts for teachers, such as prompts that indicate where and when in a lesson a teacher pauses to ask a question; when and how to redirect students, based on their behaviors or responses to questions; or when to have students "turn and talk" during collaboration routines.
- Teachers would like to have the ability to look at all of their students' work (individually and in groups) via a sortable, digital report. They would also like to be able to make comments, ask questions, and point students toward particular resources or built-in routines directly within the Thinking Space or Document functionalities within the *Writer.* Some of this functionality exists in the current version of the *Writer,* but Fable should explore ways to make these tools more obvious and usable by teachers.

4. Focus on the core educational objectives for writing and collaboration.

- Several teachers thought that the current mini-units were too complicated. In the future, the existing mini-units could be used (with modifications) as "advanced" units for classes that have considerable experience with collaborative writing.
- Fable should consider producing a set of initial, simpler activities to provide an introduction to collaborative writing routines—"one routine per lesson," for example, that can be completed in one or two regular class periods. Similarly, Fable could create targeted lessons to help address the literacy skills we mentioned above.

Quotes from teachers about Fable

> *I haven't had them collaborate as a whole group before—usually it's partners. Sometimes other students help the lower levels students. Most of them liked working with the group, but the problem is knowing how to work with a group. Learning how to get along and work together is a challenge.* (Grade 7 teacher)

> *They [the students] learned that sometimes you have to discuss things, and that's it's ok to disagree. There's a polite way to say that you disagree and you can't just take the work over. They really need to use that accountable talk. Some of them were using it for this*

process, and they have to understand why that's important. You don't have to agree, but you need to be able to say why you disagree. (Grade 3 teacher)

I think that it's [Fable] putting in technology with the reading and writing that they do, and all of the resources they need are right there. You don't have to go through the Internet. Google Classroom allows some of these functions, but you have to go into the Internet. This is all right there for them, and they don't have to go anywhere else on the Web. We have state exams coming up and it's a good way to get them used to this type of work. (Grade 3 teacher)

[Collaboration is] hard! It's interesting, though, even in education. We have been trying to learn to do more collaboration. As adults we can do a better job finding what people's strengths are, but it's hard when there's one kid that has all of the strengths. I think it's something we all have to work on together. . (Grade 3 teacher)

TABLE OF CONTENTS

INTRODUCTION **1**

Theoretical Overview 2

RESEARCH QUESTIONS **3**

Primary Questions 4

Secondary Questions 4

METHODS **4**

Study Participants and Settings 4

Features of Fable Reader and Writer Tools 6

Curriculum Materials 8

Grade 3: *Animal Adaptations* 8

Grades 6–8: *Space Mining* 9

Teacher Training 10

Study Procedures 11

Data Collection and Analysis 12

Observations 12

Final essays 12

Teacher exit interviews 13

Student reflections 13

Weekly teacher logs 13

Limitations of the Findings 13

FINDINGS **15**

Question 1: Do students who use Fable Writer produce collaboratively written products that demonstrate specific writing skills more frequently than students without access to Fable Writer? 16

Disaggregated scores 16

Aggregated scores 17

Explanation 18

Question 1a: Do outcomes differ for students in schools where academic achievement in reading and writing is low? 19

Explanation 20

Question 2: Do students who use Fable Writer engage in behaviors that support collaborating on a writing task more frequently than students who do not use Fable Writer? 20

Explanation 24

Question 3: How do teachers report that Fable Writer impacts their instructional practices regarding research, writing, and collaboration? 25

Explanation 29

Question 4: How do teachers report that Fable Writer impacts their perceptions of technology, writing, and collaboration? 29

Teacher perceptions 29

Student perceptions 30

Question 5: How do teachers report that Fable Writer impacts students' perceptions of collaboration and collaborative writing? 31

Teacher perceptions 31

Student perceptions 35

Question 6: How do teachers report that Fable Writer's teacher supports impact their implementation of collaborative research and writing? 36

Preparing teachers to use the technology 36

Preparing teachers to teach the unit 36
Preparing teachers to help students to write collaboratively 37
Suggestions for changes to the professional development 37
DISCUSSION 38
RECOMMENDATIONS 40
1. Expand professional development offerings on collaboration routines and literacy skills. 40
2. Provide more student scaffolding for collaboration routines. 41
3. Improve teacher-facing functionality around collaboration routines and student work. 41
4. Focus on the core educational objectives for writing and collaboration. 42
ADDITIONAL CONSIDERATIONS 42
REFERENCES 44
APPENDIX A: *FABLE WRITER* OBSERVATION PROTOCOL, SINGLE GROUP 46
APPENDIX B: GRADE 3 ESSAY RUBRIC 50
APPENDIX C: GRADE 7 ESSAY RUBRIC 51
APPENDIX D: STUDENT SURVEY RESPONSES 53
APPENDIX E: SAMPLE WEEKLY TEACHER LOG 57
APPENDIX F: TEACHER INTERVIEW PROTOCOL 58
APPENDIX G: SAMPLE STUDENT SURVEY 60

INTRODUCTION

In February–May 2016, Education Development Center, Inc.'s Center for Children and Technology (EDC) led an exploratory classroom implementation study of the *Fable Writer* digital tool in four public schools in New York State, Connecticut, and California. The study included 266 students in grades 3 and 6–8. The primary purpose of this work was to investigate whether using a collaborative writing tool with elementary and middle school-age students would help them produce stronger informational (for grade 3) and argumentative (for grades 6–8) writing pieces, as compared to peers in the same school who used the complementary *Fable Reader* digital library and *Reader* tools without the writing functionality. The secondary goal was to look for evidence of particular *collaborative writing strategies* (Onrubia & Engel, 2009) among student writing teams and then determine whether those strategies were associated with stronger writing outcomes.

Fable's tools—*Reader*, *Writer*, and the accompanying classroom lesson plans—provide unique opportunities for elementary and middle school students to work together online to plan, draft, and submit writing pieces. Additionally, students can incorporate digital assets, such as text (with citations) and images from e-books and websites, that their teachers have curated and assembled in a secure, online space. Previous studies have demonstrated that collaborative writing, as an approach to writing instruction, can improve the quality of students' writing and their ability to collaborate (Graham & Perin, 2007; Yarrow & Topping, 2001).

This study was a continuation of an evaluation led by EDC in October–November 2013, during Phase 1 of Fable's Small Business Innovation Research (SBIR) grant. Our findings from that evaluation, which included four schools and approximately 130 students in grades 4–8, demonstrated a small positive difference in the writing products of students who used the *StarWalk Reader* and *Writer* tools (as their features existed at that time) over those who used only the *StarWalk Reader* tool.[1] Students and teachers found *StarWalk Reader* and *Writer* to be highly engaging, and teachers generally reported that students were fully invested in the study task throughout the five-day study period.

Between Phase I and Phase II of the SBIR grant (i.e., in 2014 and 2015), Fable made several modifications to the technology interface and functionality of the *Writer* tool. Fable also added two 10-lesson mini-units on writing: one for grade 3 and one for grades

[1] Before Fable Learning's acquisition by Isabella Products in December 2015, the digital tools were called *StarWalk Reader* and *StarWalk Writer*.

6–8.[2] While not created as full replacement curricula for teachers' regular writing activities, these mini-units were intended to help place the *Fable* activities in science-related content and to provide models for collaborative learning and writing. We describe the technology modifications and the mini-units more fully in the Methods section below.

The *Fable Writer* project's theory of action posits that by working on a shared problem, such as producing an essay to persuade an audience, students will have more opportunities to engage in mutual decision-making about how to produce strong writing that uses document-based evidence effectively. Thus, students will have opportunities to engage in content-specific writing tasks that draw on their work with nonfiction texts; build on the writing and communication skills that are central to both Common Core English Language Arts (ELA) and content area standards and to the communication and collaboration skills called out in the *Framework for 21st Century Learning*; and draw on the benefits that collaboration can bring to the writing experience, as noted in Graham and Perin's (2007) review of effective strategies to improve writing.

Theoretical Overview

The *Fable Writer* project speaks to two essential skills in primary and secondary education and, more broadly, in society: writing and collaboration. The ability to write well increasingly cuts across job functions in the American workplace: 90% of white-collar and 80% of blue-collar workers indicated that writing is important to their success at work, and the majority of public and private employers say that writing proficiency directly affects their decisions about hiring and promotion (Graham, Harris, & Hebert, 2011; Graham & Perin, 2007). Further, by 2020, 35% of all job openings will require a bachelor's degree, and writing skills are critical to success in college (Carnevale, Smith, & Strohl 2013; Graham, Harris, & Hebert, 2011). More fundamentally, while writing is an essential mode of communication, it is also a way for learners to structure and deepen their knowledge across disciplines (Shanahan, 2004).

Collaboration is also an important activity in the workplace. The Partnership for 21st Century Learning includes "communication and collaboration" in its *Framework for 21st Century Learning*, which articulates the skills and knowledge students need to succeed in work and citizenship in the 21st century. Within the Framework, *collaboration* involves working effectively and respectfully in diverse teams, compromising to achieve mutual goals, and assuming shared responsibility for work (Partnership for 21st Century

[2] The grades 6–8 project was developed by the Mary Ehrenworth, Deputy Director of Teachers College Reading & Writing Project, and the grade 3 project was developed by independent literacy experts Linda Hoyt and Mary Howard.

Learning, 2016). The Common Core's ELA Speaking & Listening Standards include similar standards related to following rules for discussion and linking ideas to those raised by others (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010).

Collaborative group learning has been shown to be a highly effective teaching strategy for improving student learning outcomes (Teaching the Teachers, 2016). In fact, the increasing focus on project-based and inquiry-oriented learning in schools necessitates that students work together to accomplish goals (National Research Council, 2011). The 2015 administration of the Program for International Student Assessment, an exam to assess student learning in approximately 70 countries, includes a collaborative task in which students used an online chat tool to solve a problem together. Furthermore, social-emotional competencies related to collaboration and communication are essential to participation in a democracy (Cohen, 2006).

***Collaborative writing* is "an iterative and social process that involves a team focused on a common objective that negotiates, coordinates, and communicates during the creation of a common document"** (Lowry, Curtis, & Lowry, 2004, p. 72). It is widely practiced in business and academia and, as the definition suggests, it necessitates a range of literacy and social-emotional abilities. Writing and collaboration are themselves complex activities, and collaborative writing requires both cognitive and metacognitive skills. When introducing collaborative writing activities to children, it is important to keep developmental considerations in mind, including children's readiness to exercise and coordinate the strategies that such tasks require.

There is evidence that when students work in pairs, collaborative writing can have a strong impact on the quality of the writing (Graham & Perrin, 2007; Yarrow & Topping, 2001). In a study with 10- and 11-year-old students, Yarrow and Topping (2001) found that children who wrote in *interactive pairs* (scaffolded writing routines for pairs of more- and less-able writers) showed greater writing gains than students who wrote alone. There was also some evidence that the paired students showed higher self-esteem as writers. The current study examined whether and how a digital tool can facilitate similar interactivity among elementary and middle school students.

RESEARCH QUESTIONS

The following questions guided the data collection and analysis for this work.

Primary Questions

1. Do students who use *Fable Writer* produce collaboratively written products that demonstrate specific writing skills more frequently than students without access to *Fable Writer*?
    a. Do outcomes differ for students in schools where academic achievement in reading and writing is low?
2. Do students who use *Fable Writer* engage in behaviors that support collaborating on a writing task more frequently than students who do not use *Fable Writer*?

Secondary Questions

3. How do teachers report that *Fable Writer* impacts their instructional practices regarding research, writing, and collaboration?
4. How do teachers report that *Fable Writer* impacts their perceptions of technology, writing, and collaboration?
5. How do teachers report that *Fable Writer* impacts students' perceptions of collaboration and collaborative writing?
6. How do teachers report that *Fable Writer*'s teacher supports impact their implementation of collaborative research and writing?

METHODS

A team of six EDC researchers collected data between February and May 2016. We used a mixed-methods approach to collect and analyze the data, looking for evidence of impact on students' writing outcomes and collaboration routines, as well as the conditions that might have influenced *Fable Writer*'s effectiveness. **We conducted a two-group comparison study to examine the impact of the *Fable Reader* and *Writer* tools on elementary and middle school students' writing and collaboration skills by randomly assigning each teacher into one of two conditions: *Fable Reader + Writer* (*FW*) and *Reader*-only (*FR*).**

Below, we describe different aspects of the study, including the study participants and settings, features of the *Fable* tools, and the study conditions.

Study Participants and Settings

We conducted the study in four public schools in Connecticut, California, and New York State, allowing us to observe students and teachers using the software in a range of classroom environments; **12 teachers and 266 students (156 boys and 110 girls) in grades 3 and 6–8 participated**. Across the four schools, teachers had an average of 14 years of

teaching experience, ranging from 30 years (an Oak Bluff[3] teacher) to 2 years (a Pine Grove teacher). The schools ranged in size from relatively large to small student populations; three were in suburban settings, and one was a rural school. The schools were also situated in a variety of socioeconomic settings, as indicated by the percentage of students eligible for free or reduced-price lunch. Table 1 contains background information about each school, and Table 2 breaks down the numbers of participating students and teachers by school.[4]

Table 1: School background information

School Name	Location and Setting	Grade Range	Total Students in School	% Eligible for Free/Reduced-Price Lunch	% Hispanic	% Black	% White	% Asian	% Other
Oak Bluff Elem. School	Conn., suburban	3–5	1,039	2	3	2	85	9	1
Hamilton Elem. School	N.Y., rural	3–6	510	100	13	22	46	11	8
Pine Grove Middle School	California, suburban	6–8	999	48	65	–	28	2	5
Blue Springs Middle School	California, suburban	6–8	311	18	19	2	73	2	4

Table 2: Teachers, students, and hardware by school

School Name	Grade(s) in Study	Number of Teachers in Each Study Condition	Number of Students in Each Study Condition	School's Hardware and Study Setting
Oak Bluff Elem. School	3	*FW*: 2 *FR*: 1	*FW*: 43 *FR*: 21	Chromebooks; computer lab
Hamilton Elem. School	3	*FW*: 3 *FR*: 1	*FW*: 67 *FR*: 25	Chromebooks; classroom
Pine Grove Middle	7	*FW*: 2 *FR*: 1	*FW*: 60 *FR*: 32	1-to-1 laptops; classroom

[3] All school names used in this report are pseudonyms.

[4] The data in Tables 1 and 2 were drawn from the websites of the National Center for Education Statistics (https://nces.ed.gov/); New York State Education Department Data (http://data.nysed.gov); Connecticut Mastery Test Online Reports (http://www.ctreports.com/); and California Department of Education (http://star.cde.ca.gov/).

School Name	Grade(s) in Study	Number of Teachers in Each Study Condition	Number of Students in Each Study Condition	School's Hardware and Study Setting
School				
Blue Springs Middle School[5]	6–8	*FW*: 1 *FR*: 1	*FW*: 9 *FR*: 9	Chromebooks and iPads; classroom
	TOTALS:	**# of *FW* teachers: 8** **# of *FR* teachers: 4** **12 teachers total**	**# of *FW* students: 179** **# of *FR* students: 87** **266 students total**	

Features of *Fable Reader* and *Writer* Tools

Fable Writer is an online reading, writing, and research tool designed to facilitate synchronous, collaborative writing that enables learners to read and copy text and images from teacher-curated books in the *Fable Reader* online library. It also enables students to work collaboratively with classmates in a safe and closed online environment as they construct written responses to lesson questions, or engage in reading and writing projects. Similar to an online chat room or Google Docs—but accessible only to a teacher and his or her students—*Fable Writer* is a virtual space where teams of students can share text and images they find in a teacher-curated collection of e-books, as well as their ideas about the texts and the lesson topic. Group members can discuss one another's notes as they begin to build their responses to lesson questions and edit the final document together.

Fable Writer comprises two main components: the Thinking Space and the Document. The Thinking Space (pictured in Figure 1) is a virtual notebook where students can write notes and copy and paste images from various sources, including the *Fable Reader* library, which we discuss below. Students can see one another's entries in the Thinking Space as they are typed in real time, similar to an application such as Google Docs.

[5] Both classes at Blue Springs are designated Special Education.

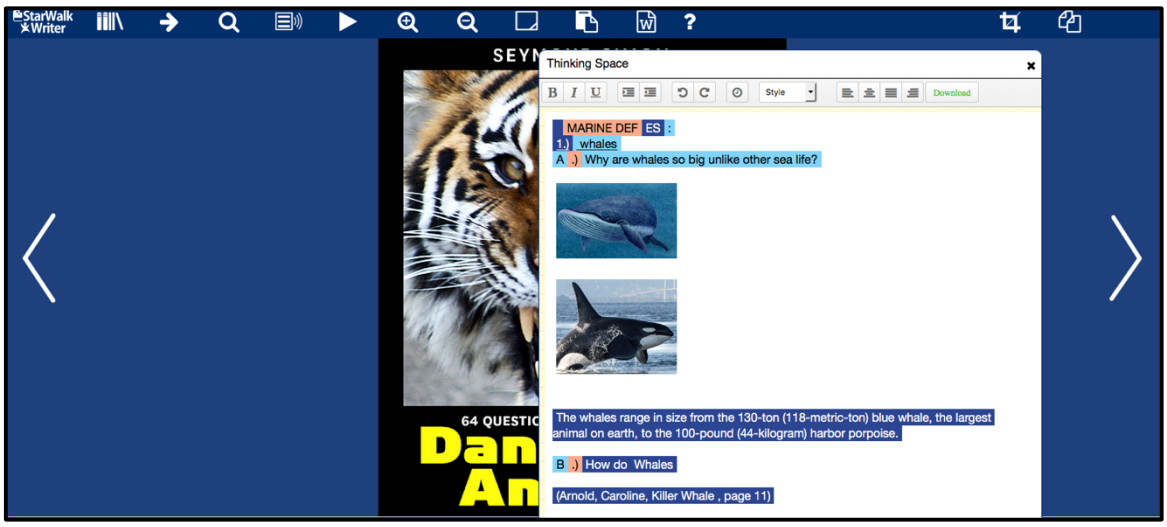


Figure 1: *Fable Writer* Thinking Space

Each student has a different color for his or her text entries, so they can distinguish their own notes from other students' contributions. Students can also add to, modify, or delete one another's materials in the Thinking Space. Material in the Thinking Space is saved automatically, though students can also save via a Save button. The Thinking Space allows students to copy, paste, and crop images and text directly from the *Fable Reader* materials. Material that is copied and pasted (from the *Fable Reader*) into the Thinking Space is accompanied by an automated citation. The Thinking Space and the Document include a number of text features, similar to those in a Word document: Students can bold, italicize, underline, indent, undo, create different heading styles, and position text. Finally, *Fable Writer* allows learners to look at and recover previous versions of text in both the Thinking Space and the Document, using a "Time Machine" functionality.

The Document is also a virtual notebook, but for final form writing. Students use the Document to compose their writing drafts and submit their final writing pieces. The text color that students chose in the Thinking Space remains the same in the Document. The essential difference between the Document and the Thinking Space is that the Document can contain headings for an essay submission.

Fable Reader (pictured in Figure 2) is a robust product that complements the *Writer* tool. It has been in use in schools for several years as a virtual library of e-books. *Fable Reader* allows students to read (or be read to via narrated text) and take notes on materials online. It also allows readers to highlight text, create notes (through a sticky-note feature), and zoom in and out on images and text.

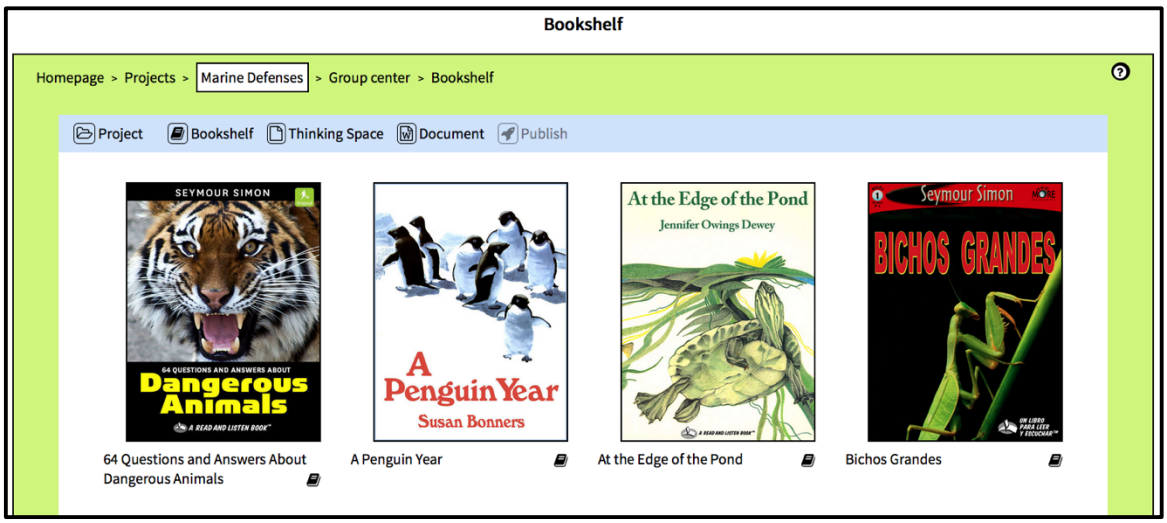


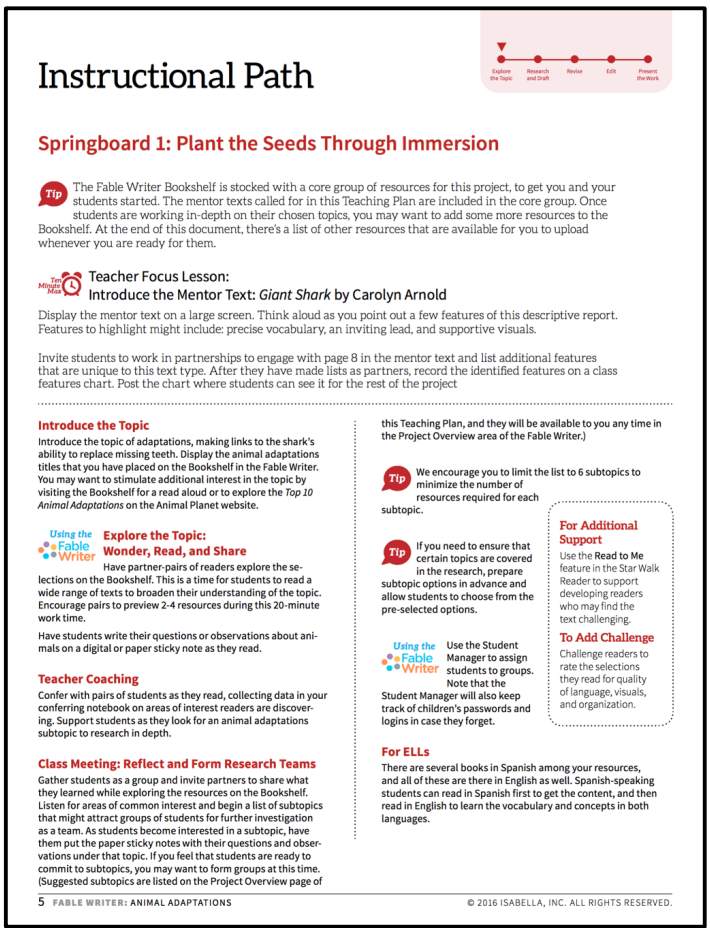
Figure 2: *Fable Reader* library

Curriculum Materials

Teachers received one of two different mini-units outlining student activities and goals that integrated the *Fable* tools, depending on grade and study condition. The grades 6–8 mini-unit was developed by Mary Ehrenworth, Deputy Director of the Teachers College Reading & Writing Project, and the grade 3 mini-unit was developed by independent literacy experts Linda Hoyt and Mary Howard. These mini-units were specifically designed to support instruction on collaborative writing using the *Fable* tools. The lesson plans within each mini-unit were intended as suggestions for teachers, rather than scripts, and were meant to provide teachers with a structure and some guidance on teaching collaborative writing during the study. In both mini-units, the *FR* lesson plans were identical to those for the *FW* groups, except that all references to *Fable Writer* were omitted in the *FR* lesson plans.

Grade 3: *Animal Adaptations*

Grade 3 teachers received a mini-unit that focused on animal adaptations. Teachers were asked to present the lesson in one of two ways: (1) have students choose a specific animal adaptation first, and then research animals with that adaptation, or (2) have students choose an animal first, and then research different adaptations for that animal. The mini-unit consisted of 10 lessons, each of which focused on a different part of the collaborative writing process (e.g., forming teams, researching, organizing, revising). At the end of the unit, students presented an informational report. Figure 3 provides an example of the page layout for a teacher's view from one lesson in the mini-unit.



Instructional Path

Explore the Topic | Research and Draft | Revise | Edit | Present the Work

Springboard 1: Plant the Seeds Through Immersion

Tip The Fable Writer Bookshelf is stocked with a core group of resources for this project, to get you and your students started. The mentor texts called for in this Teaching Plan are included in the core group. Once students are working in-depth on their chosen topics, you may want to add some more resources to the Bookshelf. At the end of this document, there's a list of other resources that are available for you to upload whenever you are ready for them.

Ten Minute Mini Teacher Focus Lesson:
Introduce the Mentor Text: *Giant Shark* by Carolyn Arnold

Display the mentor text on a large screen. Think aloud as you point out a few features of this descriptive report. Features to highlight might include: precise vocabulary, an inviting lead, and supportive visuals.

Invite students to work in partnerships to engage with page 8 in the mentor text and list additional features that are unique to this text type. After they have made lists as partners, record the identified features on a class features chart. Post the chart where students can see it for the rest of the project

Introduce the Topic

Introduce the topic of adaptations, making links to the shark's ability to replace missing teeth. Display the animal adaptations titles that you have placed on the Bookshelf in the Fable Writer. You may want to stimulate additional interest in the topic by visiting the Bookshelf for a read aloud or to explore the *Top 10 Animal Adaptations* on the Animal Planet website.

Using the Fable Writer **Explore the Topic: Wonder, Read, and Share**

Have partner-pairs of readers explore the selections on the Bookshelf. This is a time for students to read a wide range of texts to broaden their understanding of the topic. Encourage pairs to preview 2-4 resources during this 20-minute work time.

Have students write their questions or observations about animals on a digital or paper sticky note as they read.

Teacher Coaching

Confer with pairs of students as they read, collecting data in your conferring notebook on areas of interest readers are discovering. Support students as they look for an animal adaptations subtopic to research in depth.

Class Meeting: Reflect and Form Research Teams

Gather students as a group and invite partners to share what they learned while exploring the resources on the Bookshelf. Listen for areas of common interest and begin a list of subtopics that might attract groups of students for further investigation as a team. As students become interested in a subtopic, have them put the paper sticky notes with their questions and observations under that topic. If you feel that students are ready to commit to subtopics, you may want to form groups at this time. (Suggested subtopics are listed on the Project Overview page of this Teaching Plan, and they will be available to you any time in the Project Overview area of the Fable Writer.)

Tip We encourage you to limit the list to 6 subtopics to minimize the number of resources required for each subtopic.

Tip If you need to ensure that certain topics are covered in the research, prepare subtopic options in advance and allow students to choose from the pre-selected options.

Using the Fable Writer Use the Student Manager to assign students to groups. Note that the Student Manager will also keep track of children's passwords and logins in case they forget.

For Additional Support

Use the **Read to Me** feature in the Star Walk Reader to support developing readers who may find the text challenging.

To Add Challenge

Challenge readers to rate the selections they read for quality of language, visuals, and organization.

For ELLs

There are several books in Spanish among your resources, and all of these are there in English as well. Spanish-speaking students can read in Spanish first to get the content, and then read in English to learn the vocabulary and concepts in both languages.

Figure 3: Sample lesson plan page from *Animal Adaptations* (grade 3 mini-unit)

Within each lesson, there were opportunities for grade 3 teachers to reinforce specific teaching topics. The mini-unit included mini-lessons on seven topics: (1) Collaboration, (2) Research, (3) Drafting, (4) Revision, (5) Editing, (6) Preparing to Publish: Page Layout and Features, and (7) Sharing Their Work.

Grades 6–8: *Space Mining*

Grades 6–8 teachers received a mini-unit that led to the creation of a written proposal (a form of argumentative writing) about space mining to send to NASA. Students were asked to make an argument for either asteroid mining or terraforming. This mini-unit consisted of 10 lessons, each of which was expected to take one class period (generally 45 minutes) to complete.

This mini-unit followed an instructional arc of activities that helped students identify a topic; ask questions; conduct research; compare, contrast, and re-categorize information about their topic; test their arguments through "flash debates"; and draft, edit, revise, and present their proposals. Unlike the grade 3 materials, the mini-unit did not include mini-lessons for additional focus, but each lesson did include "Teaching

Points" and "Coaching Tips" to help students focus on the day's focal concepts and skills. It also included a "Collaboration Timeline" document that offered guidance to teachers on helping their students with collaboration routines for each lesson. Figure 4 provides an example of the page layout for a teacher's view from one lesson in the mini-unit.

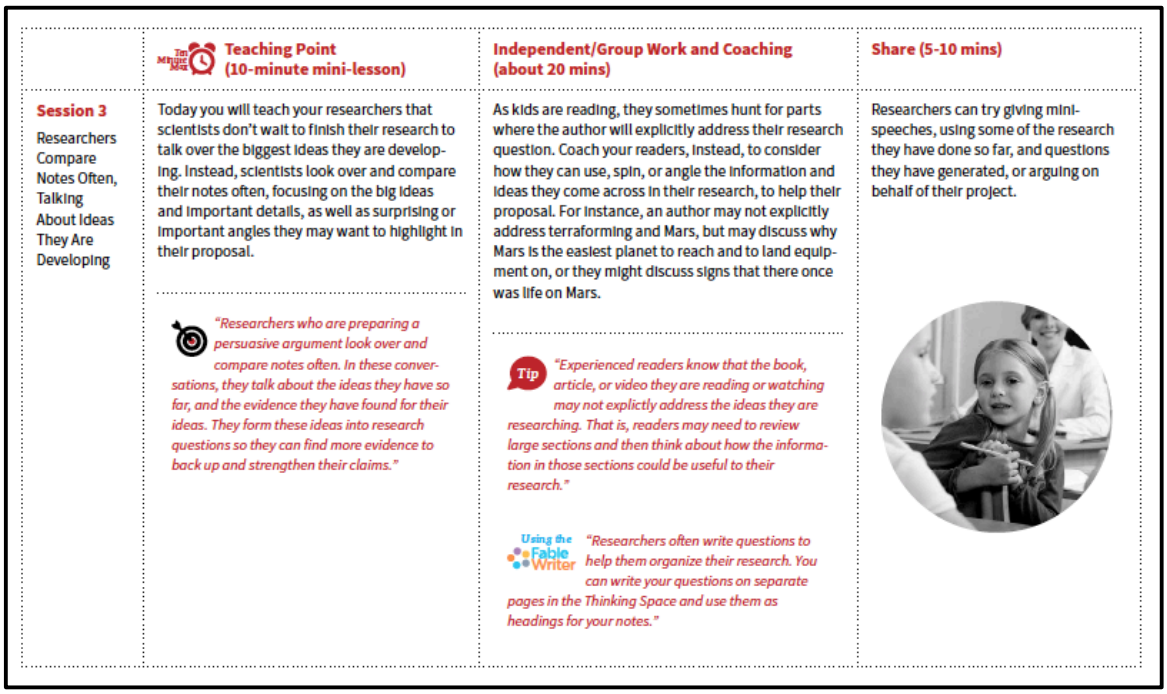


Figure 4: Sample lesson plan page from *Space Mining* (grades 6–8 mini-unit)

Teacher Training

All teachers participated in either a webinar or an in-person meeting, run by Fable staff. The *FW* group webinars lasted 90 minutes, and the *FR* group webinars lasted 1 hour. The purpose of the webinars and in-person meetings was to introduce teachers to the tools (the *Reader* for *FR* teachers and the *Reader* and *Writer* for *FW* teachers) and the lessons. In total, Fable staff conducted eight webinars and in-person trainings. Teachers were grouped by school. At Hamilton, Fable held two in-person sessions; participants were not divided by study condition. The other three schools each had two sessions—one for *FW* teachers, and one for *FR* teachers.

The sessions were an opportunity for teachers to meet Fable staff and EDC researchers. Fable staff began the webinars by introducing why collaboration is important, how the *Fable* tools can potentially help foster collaboration, and how to use the tools, and then briefly walked teachers through the lesson plans. Teachers were able to ask questions about the tools and the lessons. The sessions also provided teachers with access to a set of resources, including lesson plans, mini-lessons, teacher and student checklists (both

of which were made to be altered by teachers as needed), FAQs, and overview videos, located in a folder on Google Drive.

Study Procedures

We conducted a two-group comparison study to examine the impact of the *Fable Reader* and *Writer* tools. The 10-lesson study took place in 12 classes in the four schools. Grade 3 classes received the "Animal Adaptations" unit described above, and grades 6–8 classes received the "Space Mining" unit. As noted, before beginning the units, all teachers participated in a live webinar or face-to-face training for 1 hour or 90 minutes, led by a Fable staff member. Each school had its own training session. During the training, teachers were familiarized with the interfaces and functionality of the *Reader* and *Writer* tools, as well as basic group management procedures, such as "creating groups" and "assigning students to groups." Fable also provided teachers with access to recordings of the webinar sessions for later reference.

At the beginning of the study, grade 3 students were divided into groups of three or four by their teachers (sometimes based on students' preferences) and were tasked with writing an informational essay. Similarly, students in middle school classrooms were divided into small groups by their teachers (again, sometimes based on students' preferences) and were tasked with writing an argumentation proposal. In all cases, student groups were asked to create a writing product by working together to gather evidence and compose a final essay for submission.

While the assignments were different depending on grade level, all students used the same tools across grades within their study condition. Students in treatment condition classrooms used the *Fable Reader* and *Writer* tools, while students in the comparison condition classrooms used only *Fable Reader*, plus any "business as usual" writing tools (e.g., Google Docs, Microsoft Word, paper-based student writing notebooks) the teacher might typically use. The general flow of student activities in both classes during the study occurred as follows:

- Teachers introduced the assignment and then pre-assigned groups or asked students to let their particular interests inform how they would be grouped and what kind of questions they would answer in their essay.
- In their groups, students determined which questions were most important to answer and then gathered information and ideas from resources in the *Fable Reader*.
- Students took notes either in the Thinking Space, on a piece of notebook paper, or on a teacher-created template.

- As a group, students decided how they would produce the final writing piece (e.g., one person would do the writing; each student would work on one paragraph).
- Students produced the final writing piece, submitted it to the teacher, and presented it to the class.

Data Collection and Analysis

We used the following data collection methods: whole-class and single-group classroom observations; analysis of final essays, using rubrics; teacher exit interviews; weekly teacher logs; and student reflection surveys at the end of the study. Each is described below.

Observations

We observed all 12 classes at least twice during mini-unit implementations. Using two observation protocols—one for single groups of students, and one for the whole class—researchers documented students' engagement, collaboration routines, and participation in the reading, researching, and writing activities. Researchers periodically asked students questions as they worked, and listened in on conversations between group members in order to gain an understanding of how they made decisions about collaborating. Conversations during the class with teachers and classroom aides provided context for the interactions we observed. Data from the observations are woven throughout this report.

Final essays

At the end of the study, we collected students' final essays and scored them using rubrics based on a combination of teacher and student checklists for grade 3 and grades 6–8 activities. For the grade 3 rubric (see Appendix B, p. 50), we adapted the Fable team's "End of Project Teacher Analysis" rubric and used a three-point scale with benchmarks for each score. For the grades 6–8 rubric (see Appendix C, p. 51), we compiled rubric items from the teacher checklists, student guidelines, student checklists, and student tip sheets within the grades 6–8 mini-unit. We omitted redundant items and focused on items around argumentation and substantive text features (such as visual supports).

The grades 6–8 rubric comprised three parts: a checklist, an eight-item argumentation rubric, and a three-item text features rubric. The checklist included five items that could be either present or absent in student essays (e.g., a cover page), while the two rubrics included items that could be judged as missing, used correctly and consistently, or used in sometimes incorrect or inconsistent ways. Like the grade 3 rubric, the grades 6–8 rubrics used three-point scales, with benchmarks for each score.

Students across the 12 classrooms submitted a total of 60 final essays. To assure inter-rater reliability for scoring essays, two EDC researchers coded final essays together until reaching 85% agreement on all codes for grade 3 and grades 6–8 essays. Each essay received a score based on the sum of the sub-scores for the rubric criteria. We then analyzed the essay data informationally by comparing the mean scores between the *FR* and the *FW* groups, as summarized in the Findings section below.

Teacher exit interviews

All teachers participated in a 30-minute exit interview to reflect on their experiences during the study. The semi-structured interview protocol included questions under five headings: (1) General impressions and reflections (i.e., their general impressions about the experience, and highlights among the successes and challenges they experienced); (2) Impressions of the PD; (3) Impressions of the technology; (4) Impressions of the mini-units (i.e., the content and activities); and (5) Professional backgrounds. During the interviews, teachers also provided valuable recommendations and suggestions for improving the *Fable* tools. Interview data were used to answer questions 3–6, and teachers' comments during the interviews are woven throughout this report. The teacher interview protocol is included in Appendix F (p. 58).

Student reflections

After they submitted their final essays, students across the 12 classrooms completed an online reflection survey (see Appendix G, p. 60 for a sample student survey). Specific questions varied by grade and classroom designation. Data from the reflection surveys are woven throughout this report.

Weekly teacher logs

Teachers completed weekly online activity logs, based on the activities delineated in the mini-units for each week. The logs varied by grade and study condition (see Appendix E, p. 57 for a sample log for an *FW* teacher). Teachers checked off each activity they had completed with their students that week. If they did not complete an activity, they checked one of three options to explain why: (1) "Not enough time," (2) "Not necessary," or (3) "Not relevant."

Limitations of the Findings

The findings we discuss below should be considered in light of four limitations that significantly affected classroom implementation of the *Fable* tools during the study:

- Technical difficulties associated with the *Fable* tools or school-network infrastructure

- The amount of time it took to implement the mini-units
- Students' preparedness to work with the focal literacy activities
- The small sample size

Eight of the 12 teachers reported that technical difficulties related to logging in, bugs in specific functions of the *Fable Reader* and *Writer* tools (e.g., copying and pasting images and text, cropping images, unclear page and paragraph breaks in the Thinking Space), and work lost because group members often mistakenly deleted one another's work, slowed down implementation of the unit and frustrated students. Students' open-ended comments in surveys also reflected this frustration: Of the 204 *FW* students who responded to the survey, 155 (76%) made comments regarding technical problems such as log-in challenges, lost work, and a difficult interface, while 11 of 66 *FR* student survey respondents (17%) complained about technical issues. Because of these challenges, six teachers and their students used Google Docs for at least part of the unit as an alternative in order to finish the project.

A related issue was the amount of time it took to complete the mini-units. At the beginning of the study, Fable staff told teachers that they needed to complete the project implementation in two to five weeks, over 10 class periods. However, it took an average of 17 periods to complete the units, and four teachers required 20 or more periods to complete them. This was partly due to the technical challenges we discussed above but was also a function of the complexity of the mini-units, which a third of the teachers (4 of 12) thought were unrealistic in terms of expectations of students and teachers. One *FW* teacher remarked,

> *We extended it from 10 lessons to probably like 20. It's very silly to expect kids to draft in two days and revise and edit in one day when it's three kids working together.*

Another teacher said, "I doubled the class periods to 20, trying to do it. Some of them got to the revising, but editing didn't happen at all. It was unrealistic."

A third limitation was that 7 of the 12 teachers (in elementary and middle schools) thought that their students were not prepared to do the work that the activities required. One elementary school teacher commented, "The curriculum is great, but it's not developmentally appropriate for what my students are expected to do in third grade. Fourth grade would have been a great age to start." A middle school teacher said,

> *The lesson plans were geared for students who have already learned argumentative or informational writing. We could have gone through it much more smoothly if we had already done those lessons, but we weren't there yet.*

Teachers reported that they spent additional periods covering topics that they had not known would arise during the project. They did not reject the need to cover those topics or to create supports for their students; rather, they simply noted that it added time to the unit implementation and that Fable did not provide enough supports in the mini-unit materials. As one grade 7 teacher said,

> *For instance, my students had a very difficult time trying to find things in the text that were not specifically about their subject. It's a skill they need to learn, but I had to do a lot of scaffolding around it. For example, if there was a website on terraforming, they were great about researching the article. But if it was about Mars, then they had a hard time translating the information into a terraforming argument. There were talking points in the* Fable *lesson plans about this, but it really needed to be scaffolded much more than it was. A lot of students struggled with that.*

The fourth limitation was the study's teacher sample size. With a larger sample size (for example, with only one grade in the study rather than two), we might have been less likely to see as many variations based on individual teachers' approaches to teaching writing and using technology (discussed in more detail below). Additionally, the small teacher sample size makes it impossible to draw any generalizable conclusions about the study findings.

These challenges affected students' and teachers' abilities to complete the projects, as well as their perceptions of the *Fable* tools. Several teachers thought that the final writing products their students submitted did not reflect the quality of work that they did under other circumstances. Twenty essays of the 80 that we collected (25%) were incomplete (and therefore not rated) at the end of the study. It is important to keep all these challenges in mind when interpreting the findings.

FINDINGS

The research findings are organized beneath each of the six research questions (p. 3). When answering these questions, our main goals were to provide insight into (1) whether and how the *Fable Writer* technology and classroom activities helped students with specific writing practices and in collaborating with one another, and (2) how teachers used the technology and instructional materials.

Question 1: Do students who use *Fable Writer* produce collaboratively written products that demonstrate specific writing skills more frequently than students without access to *Fable Writer*?

The student essays in the *FW* condition at two of the four schools were scored higher than the essays of peers in the *FR* condition.

- The grade 3 *FW* essays at Hamilton were scored 2.2 points higher, on average, than the essays of their peers.
- At Blue Springs (grades 6–8), the average essay score for the three *FW* groups was 26.3, vs. an average of 16 for the three *FR* groups—a difference of 10.3 points.

Disaggregated scores

Tables 3–6 display the disaggregated final essay scores for both groups at each of the four schools.

At Hamilton (Table 3), the average essay score for the *FW* groups was 17.4, and the average for the *FR* groups was 15.2—the *FW* groups scored 2.2 points higher than their peers. In Oak Bluff (Table 4), however, the average essay score for *FR* groups was 22, vs. 19.6 for *FW* groups—here, the *FR* groups scored 2.4 points higher than the *FW* groups.

Note: The differences between the groups at both grade 3 schools essentially negate each other when aggregated (see Table 7), since the *FW* group scored slightly higher than the *FR* group at one school and slightly lower at the other school.

Table 3: Final essay scores, Hamilton (grade 3)

	***Reader*-only groups (*n* = 5)**	***Reader* + *Writer* groups (*n* = 15*)**
Average essay score**	15.2	17.4

* Does not include six essays that were not completed

** The maximum possible essay score is 24.

Table 4: Final essay scores, Oak Bluff (grade 3)

	***Reader*-only groups (*n* = 6)**	***Reader* + *Writer* groups (*n* = 6*)**
Average essay score**	22	19.6

* Does not include three essays that were not completed

** The maximum possible essay score is 24.

The final essay scores of the grade 7 *FR* groups at Pine Grove Middle School were slightly higher than those of the *FW* groups (Table 5). In contrast, the scores of the *FW* groups at

Blue Springs (grades 6–8) were more than 10 points higher than their peers (Table 6): The average essay score for the three *FR* groups and the three *FW* groups were 16 and 26.3, respectively.

Table 5: Final essay scores, Pine Grove (grade 7)

	***Reader*-only groups (*n* = 8)**	***Reader* + *Writer* groups (*n* = 14*)**
Average score for each group**	27.1	26.4

* Does not include one essay that was not completed.

** The maximum possible essay score is 38.

Table 6: Final essay scores, Blue Springs (grades 6–8)

	***Reader*-only groups (*n* = 3)**	***Reader* + *Writer* groups (*n* = 3)**
Average score for each group*	16	26.3

* The maximum possible essay score is 38.

Aggregated scores

Table 7 displays the aggregated average essay scores for all student groups in grades 3 and 6–8. On average, there was little difference in the overall essay scores for students in both groups at the two schools with grade 3 classes. For both schools, the grade 3 student essays in the *FR* groups received an average score of 18.9 (of a possible 24), and the essays in the *FW* groups received an average score of 18. Thus, on average, students in the *FR* groups scored slightly higher (0.9) than their peers in the *FW* groups.

Table 7: Final essay scores, all participants

	***Reader*-only groups**	***Reader* + *Writer* groups**
Average essay score, all grade 3 classes*	18.9 (for 11 essays scored)	18 (for 21 essays scored)**
Average essay score, all grades 6–8 classes***	24.1 (for 11 essays scored)	26.4 (for 17 essays scored) **

* The maximum possible essay score is 24.

** Does not include nine incomplete student essays in grade 3 and one incomplete essay in grades 6–8.

*** The maximum possible essay score is 33.

There was a bigger difference in mean essay scores across the two groups in the grades 6–8 classes. The grades 6–8 essays in the *FR* groups received an average score of 24.1 (of a possible 33), and the essays in the *FW* groups received an average score of 26.4. On average, students in the grades 6–8 *FW* groups scored higher than their peers in the *FR* groups by 2.3 points.

Explanation

We discuss possible reasons for the writing outcomes thematically in the Discussion section below, but we want to briefly note that the relatively minor differences in scores for the two grade 3 conditions at both schools might be attributable, in part, to two challenges:

- We observed, and teachers reported on, the fact that students and teachers in the *FW* groups (especially at Oak Bluff) experienced significant difficulties with the *Writer* technology, which regularly resulted in slowdowns, frustration among both students and teachers, and lost work. For example, in the Oak Bluff *FW* group student surveys, 10 of the 34 students complained about access issues (i.e., logging in and loading the tool), 8 students mentioned lost writing, and 15 students complained about other or general bugs with using the tool (making "bugs" a top theme in the survey comments for that group). Both *FW* classes were unable to complete the "Animal Adaptions" unit as intended because of technology failures, and both needed to use Google Docs at points to take notes. As one teacher commented, "We did 14 lessons and still didn't finish. The final products looked kind of rough."
- Some of the grade 3 students (again, especially at Oak Bluff) had a difficult time collaborating, as they were used to having full control over their own work, without having to negotiate or compromise with other students about what to include in the essay.

Several other factors might have contributed to the higher essay scores among the *FR* essays at Oak Bluff. Our teacher interviews and observations revealed that the students and teacher in the *FR* class were much more practiced with routines for working in groups, and they were more experienced with working on nonfiction research and writing projects than their peers were. The *FR* teacher at Oak Bluff commented,

> *The big thing for me and for them is that I love collaboration in partnerships. It worked out so well and figuring out who was negotiating which part . . . There were a few kinks to work out, but I talk a lot about compromise and people's strengths and your interests. They're used to it.*

She also noted that her students practice writing "every day. Writing is my thing. We do 45 minutes a day: a 10-minute mini-lesson, 30 minutes of writing, and then sharing." In contrast, one of the *FW* classes at Oak Bluff had a large number of students with special needs who are less accomplished with their writing. Further, while both Oak Bluff *FW* teachers also ordinarily dedicate large amounts of time to writing (the school uses the Teachers College Reading & Writing Project workshop model), both also said that they were not practiced with collaboration routines or especially comfortable with using new

technologies. These comments are corroborated by 32 student survey responses (of a total of 54) at Oak Bluff, where students indicated that they used more technology than usual during the study, making it one of the most frequent student survey comments from that school.

It is likely that these factors had some influence on the overall quality of the essays. For example, two of the criteria in the rubric—"Paragraphs maintain the focus on the question" and "A powerful conclusion to the book [essay] brings closure"—required significant amounts of coordination among each writer in a group. When students were unable to coordinate, the essays tended to be disorganized and unfocused or had no clear conclusion.

Several factors relating to teachers' content knowledge and experience with teaching writing are likely to have contributed, in part, to the large differences in mean essay scores across the two groups at Blue Springs. During her exit interview, the *FR* teacher, whose content areas are ordinarily math and science, indicated that she was not comfortable with the content of the mini-unit. She believed that her lack of familiarity with the topic affected students' perceptions of the activity:

> *I know nothing about space mining. I found myself saying, "I don't know, let's look it up." If the topic had been different, they [the students] would have been more engaged. Some students were very vocal and saying things like, "I hate the topic, so I don't want to do it."*

Furthermore, the teacher may have had difficulty helping her students find appropriate resources for their writing projects—a majority of the students in the *FR* group (five of the nine) commented on the survey that the tool did not have enough books on their topic, while only one of the nine students in the *FW* group expressed the same sentiment.

In contrast, the *FW* teacher noted that she was more comfortable with leading writing instruction and that she had experience with having her students write collaboratively, which may have contributed to students' engagement with collaboration. Three of the nine students in the *FW* group said they enjoyed the collaborative aspect of their work with *Fable*, while none of the students in the *FR* group mentioned this.

Question 1a: Do outcomes differ for students in schools where academic achievement in reading and writing is low?

Table 8 lists the percentages of students who are designated as "proficient" in reading and writing at each participating school. Three of the four schools—Pine Grove, Blue Springs, and Hamilton—are designated as "low achieving" in reading and/or writing.

The two schools that evidenced higher scores among the *FW* groups—Hamilton and Blue Springs—are included in the "low achieving" group.

Table 8: State Writing and Reading test results[*]

School	% of Students in School at Proficiency	
	Writing	Reading
Oak Bluff[**]	94.6	95.6
Pine Grove[***]	**39**	
Blue Springs[***]	**37**	
Hamilton[****]	**11**	

[*] Bold-faced schools are designated "low achieving."

[**] The most recent reading and writing scores from the Connecticut Academic Performance Test are from 2013.

[***] California uses a California Standards Test for ELA and does not break down scores into reading and writing; scores are aggregated.

[****] New York State uses an ELA test and does not break down scores into reading and writing. Test results are from the 2015 assessments; scores are aggregated.

Explanation

Tools such as *Fable Writer* and *Fable Reader* often have the greatest benefit for the students who need them most, as the technology can have a leveling effect. This may explain why the positive comparative outcomes for the *FW* groups took place at low-achieving schools, similar to our Phase I findings.

Question 2: Do students who use *Fable Writer* engage in behaviors that support collaborating on a writing task more frequently than students who do not use *Fable Writer*?

From 35 single-group observations, students in grade 3 classes exhibited a greater number of behaviors demonstrating collaborative writing than students in grades 6–8 classes. We observed most of these behaviors (in five of eight observations) in the grade 3 *FW* classes. We did not observe any of these behaviors in the grades 6–8 classes, regardless of study condition. In all cases, however, the majority of behaviors were "low collaboration" (i.e., students tended to work in parallel for most of the task, as opposed to engaging in regular dialogue about all activities). Our analyses did not reveal any relationship between progress in the number of activities (i.e., we observed different strategies at various points in the beginning, middle, and end of the unit) and the number of observed collaborative writing strategies. Classrooms with more "true collaboration" (shared control and responsibility) tended to have higher mean essay scores, but we cannot determine whether there is a causal relationship between the two.

At each participating school, at least one researcher observed one or two of the same groups of students (generally in groups of three or four, as teachers had assigned them) for at least two of the site visits. The goal of these "single-group observations" was to track how students worked together as they constructed their essays over time. Appendix A (p. 46) includes the observation protocol that researchers used when sitting with groups.

As groups worked on their primary activity during the observation, researchers looked for evidence of five specific collaborative writing strategies:

1. *Parallel construction: "cut and paste"*: Control and responsibility for the work are independent—group members work separately on a part of the document and only have control over and responsibility for their own part of the writing process. In the end, they simply paste their parts together.
2. *Parallel construction: "puzzle"*: Same as above, except that in the final part of the writing process, control and responsibility for producing the document fall to one group member who is responsible for completing the document.
3. *Sequential summative construction:* Group members take turns having control and responsibility for the writing product and doing the writing.
4. *Sequential integrating construction:* Control and responsibility are shared. Group members have successive and equitable access to the document and take turns doing the writing.
5. *Integrating construction:* Control and responsibility are shared and distributed among group members.

Note that the strategies start as *cooperative* (i.e., working toward the same goal, but independently of one another) and become progressively more *collaborative* (i.e., sharing responsibilities and engaging in dialogue each step of the way).

During an observation, the researcher identified the "primary activity" for that session. Student groups usually worked on more than one activity, but we identified the activity that seemed to take the most amount of time, or student focus, in order to apply one of the five strategy codes listed above. Our protocol listed eight types of activities that researchers could use to identify the main activity:

1. *Brainstorming* (i.e., developing ideas for a paper draft)
2. *Converging on brainstorming* (i.e., deciding as a group what to do with the brainstormed ideas)
3. *Outlining* (i.e., creating a high-level direction in which the document will be going, including major sections and subsections)

4. *Drafting* (i.e., writing the initial incomplete text of a document, including inserting images and writing captions)
5. *Reviewing* (i.e., having a participant or an editor read and annotate document draft sections for content, grammar, and style improvements)
6. *Revising* (i.e., making changes to the draft in response to the reviewer's comments)
7. *Copyediting* (i.e., making final changes that are universally administered to a document to make it more consistent)
8. *Other* (e.g., researching, typing, going through the final checklist)

We did not find any patterns in the relationship between the main activity and the collaborative writing strategy. For example, of the five instances of "integrating construction," one resulted from a brainstorming activity, one resulted from a revising activity, and three resulted from activities coded as "other," which included "reading together and discussing what to highlight together" and "partners erase, add to, and talk about what others have written about in real time."

The total number of single-group observations for both study conditions at each school varied for several reasons, for example, (1) there were more *FW* than *FR* classes at each school; (2) teachers were sometimes absent during site visits; and (3) teachers did not always have their students break out into their individual groups during visits because they were at difference places in the units. Therefore, **Table 9 below does not reflect an equal number of observations per school or class, and the table should be viewed only as a broad indicator—rather than an absolutely equal comparison—of the types of strategies we observed for both study conditions.**

Table 9: Count of "collaborative writing strategy" by school and study condition

	Cooperative strategies <<<<<<<<<< >>>>>>>>>> Collaborative strategies				
School	**Parallel construction: "cut and paste"**	**Parallel construction: "puzzle"**	**Sequential summative construction**	**Sequential integrating construction**	**Integrating construction**
Oak Bluff *FR*	3				3
Hamilton *FR*	2				
Pine Grove *FR*	1	1			
Blue Springs *FR*	4				
	10	**1**	**0**	**0**	**3**
Oak Bluff *FW*	2	1			
Hamilton *FW*	8	1		3	1
Pine Grove *FW*	3				
Blue Springs	2				

FW					
	15	2	0	3	1
TOTALS	25	3	0	3	4

Reading across the column headings in Table 9 from left to right, the writing strategies become progressively more collaborative and less cooperative. For all groups that we observed, 80% (28 of 35) of the observed activities were coded either as "parallel construction: cut and paste" (25) or "parallel construction: puzzle" (3). Students generally work independently of one another when using these strategies. As an example, an observation note for a "parallel construction: cut and paste" activity indicated, "Each student in the group was working on something different; each has his or her own section." Another researcher observing the same strategy noted, "There is not much talking within the group; students are doing their own individual research."

Given that many group activities are characterized by students working on separate tasks followed by an integration of their products toward the end of a project, it is not surprising that the majority of the activities we observed were coded as "parallel construction." The prevalence of parallel tasks also does not seem unusual because most of the participating teachers were inexperienced with leading collaborative activities for their students.

In contrast, we coded 20% (7 of 35) of the activities as "sequential integrating construction" or "integrating construction." In these strategies, the control and responsibility for a task is shared among the group members; that is, they are more collaborative in their work. Most (4 of 7) of the tasks coded as "integrating construction," the most collaborative of the five strategies in this framework, were observed in the *FR* class at Oak Bluff, and we observed one instance each in the Hamilton *FW* classes. One researcher noted the following about an activity that was coded "integrating construction":

> *It is clear that students have been taught how to talk/share their ideas to one another and to adults in a respectful way. Students followed directions and stayed on task during class time . . . The students are organized into small groups and the teacher announces the objective. The students are talking to each other and sharing their ideas openly and willingly, one at a time, as they take notes.*

We also observed three instances of "sequential integrating construction" in two *FW* classes at Hamilton. Using this strategy, students build from a piece of writing (in this case, usually just one or two sentences in the Thinking Space) started by one member of the group; they do not make changes to the original writing, but they make suggestions as they add their own pieces. One researcher who observed this strategy noted,

> *I asked students how they had gotten to this point, and they said they each wrote a section based on their particular interest. The interesting part about this group was that they were showing some qualities of the "Integrating Construction" behavior while I was there. Students were entering sentences, and others in the group were making comments to each other about the new sentences and doing on-the-fly editing and brainstorming.*

We did not directly observe any instances of "sequential summative construction" during our site visits. When using this strategy, one group member presents a piece of writing to the other group members, who then add their own contributions without making any modifications to the first author's piece. Both *FW* teachers at Oak Bluff reported that some groups of students did use this strategy (with and without explicit instructions from the teachers); however, this occurred after having too many experiences with students deleting one another's work while writing simultaneously.

From our coding of the single-group observations, it is clear that there is a relationship between explicit teacher guidance and the occurrence of the more collaborative strategies. During each of our observations in the Oak Bluff *FR* class, we regularly heard the teacher give her students instructions for partnering, including how groups should divide tasks and how they should listen to one another's ideas and then decide what to include in their writing (e.g., regarding which books to draw examples from). The Oak Bluff teacher circulated among her students as they worked and sometimes gave them advice about how to talk with one another. This teacher also has her students regularly review and discuss one another's writing. While we cannot account for how collaborative those discussions were because we did not observe them, it is reasonable to suggest that regular practice with discussing one another's work helped these students be more receptive to collaborating. During three other site visits at Hamilton, we observed similar guidance from two *FW* teachers.

In other classes (including both *FR* and *FW* classes), however, we did not observe much guidance from teachers about collaborative writing strategies. Often, students adopted the "parallel construction" strategies by default or out of necessity, as in the example of erroneously deleted work that we referenced above. In general, when teachers did not model collaboration routines nor give explicit guidance, students tended to work in parallel with one another until it was time to work in the final Document.

Explanation

Similar to our findings about the student essay scores, it is likely that teachers' pedagogical styles, more than the presence or absence of the *Fable* technology, were largely responsible for the occurrence of collaborative writing strategies. In all cases where we coded activities as instances of more collaborative strategies, we observed the

teacher giving clear guidance about collaboration and coaching groups on how to work together on the activity.

The average score on the essays for conditions that included these collaborative strategies was higher than the average score of their counterparts. In Oak Bluff, the average score for the *FR* groups' (where we observed three instances of "integrating construction") essays was 2.2 points higher than the *FW* groups; in Hamilton, the average score for the *FW* essays was 2.4 points higher than the *FR* groups'. We do not have enough data to conclude that there is a clear relationship between more collaborative strategies and improved writing outcomes; we would need additional research with more students and teachers. Further, we cannot draw any conclusions about the grades 6–8 scores because we did not observe any of these strategies in those classes. But it should not be surprising that in cases where teachers provided more structure and guidance for these types of collaborative writing tasks, the final products were stronger.

Question 3: How do teachers report that *Fable Writer* impacts their instructional practices regarding research, writing, and collaboration?

During exit interviews, all 12 teachers (eight *FW* and four *FR*) said they would use the *Fable* tools again in the future, provided that there are significant changes either to the *Writer* technology or to the classroom activities, which we discuss below. No teachers reported any significant changes—or plans to make changes—to their existing teaching practices based on their experiences during the study. Several *FW* teachers remarked that the convenience of having research materials (i.e., the materials in the *Fable Reader* library) and a writing tool together in one online location had the potential to make future instruction easier because teachers and students might spend less time switching between technologies or searching for resources from different locations on the Web.

Most teachers had established routines for teaching research and writing: 10 of the 12 said that they spend at least several periods per week focusing on writing instruction, and 8 of the 12 said that they spend at least one period per day focused on student writing. Despite their experience with teaching writing, however, none of the teachers were able to complete all the activities called for in the mini-units. Table 10 summarizes information about unit implementation for each teacher.

Table 10: Summary of unit implementation among all teachers

Teacher	Total number of periods to complete the unit	Total number of lessons taught[◆]	Total number of possible classroom activities in the lessons taugh	% of activities completed	% activities not completed– "Not enough time"	% activities not completed– "Not necessary"	% activities not completed– "Not relevant"
Oak Bluff *FW* 1[*]	20	8	99	71	21	1	N/A
Oak Bluff *FW* 2	14[**]	5	66	41	59	N/A	N/A
Blue Springs *FW* 1	15–16	11[***]	93	59	32	6	3
Pine Grove *FW* 1	14–15	10	86	53	34	8	5
Pine Grove *FW* 2	14	9	79	53	41	4	2
Hamilton *FW* 1	40	12[***]	151	68	24	7	1
Hamilton *FW* 2	10[**]	3	40	50	48	2	N/A
Hamilton *FW* 3	20+	6	76	46	13	20	21
Pine Grove *FR* 1	10	10	81	80	11	9	N/A
Blue Springs *FR* 2	15	11[***]	89	71	20	2	7
Hamilton *FR* 1	20	10	117	65	24	2	9
Oak Bluff *FR* 1	13	12[***]	143	59	10	14	17

[**] Teacher did not complete the mini-unit.
[***] Teacher taught at least one lesson multiple times.
◆ Each mini-unit had 10 lessons, but some teachers taught the same lesson more than once.

The highest percentage of activities completed by any teacher was 80% (Pine Grove *FR*), and the lowest was 41% (Oak Bluff *FW*). As the table demonstrates, **teachers were more likely not to complete activities because of time limitations (average 28%) rather than because they were not needed (average 7%) or not relevant (average 6%)**. These percentages suggest that most teachers generally found the activities to be useful but did not have time to implement them all.

Two teachers stand out from the others in terms of why they did not complete activities: Hamilton *FW* 3 and Oak Bluff *FR* 1:

- The first teacher indicated that she did not complete 20% of the activities because they were "Not necessary," and 21% because they were "Not relevant." These are higher percentages than the other teachers in the study. During our

interview with her, this teacher indicated that she chose to consider the mini-units as "guides, not scripts," noting, "I really did my own thing most of the time." The teacher veered from the recommended activities as she deemed appropriate, or based on her own teaching style.

- The Oak Bluff *FR* 1 teacher noted that she did not complete 14% of the activities because they were "Not necessary," and 17% because they were "Not relevant." As we learned during her interview, this teacher was very experienced with using her own routines for student writing and collaboration and therefore believed that she did not need to include some of activities that focused on student collaboration.

Below are the features of the mini-units that the grade 3 teachers said they liked best, followed by a representative teacher quote:

- *Scaffolding for student feedback* (mentioned by three teachers): "[The students] did a much better job with giving each other feedback than they usually do. They were able to phrase their constructive pieces well; some had really good constructive feedback for each other. You could hear students say, 'That's a good point.'"
- *Student checklists* (mentioned by two teachers): "I thought that the checklists were helpful, but I revamped them for what my kids were doing. It was a learning process to teach them how to use a checklist and monitor their work."
- *Class meetings* (mentioned by two teachers): "I liked the class meetings—they [students] had questions for the group before and after they work together. It got them talking and created a path for them to do the work."
- *Mini-lessons* (mentioned by two teachers): "I like how it said use this mini-lesson or do your own. A lot of the time I did my own, but I did use their examples."

Below are the features of the mini-units that grade 7 teachers said they liked best, followed by a representative teacher quote:

- *Cross-curricular content* (mentioned by two teachers): "I liked the idea and that the unit incorporated a couple other content areas."
- *Problem-focused activities* (mentioned by one teacher): "It was an engaging unit. I like that it presented students with a problem and presented them with the choice of terraforming or mining. Even if they were not interested in space, giving them a little bit of choice and agency was good."
- *Real-world application of writing* (mentioned by one teacher): "I liked that it was like an argumentative essay, but that it was a real-world version of one because they had to submit the proposal to NASA. We also showed them an example of an actual proposal that another teacher had found."

Four teachers said that the mini-units did not include enough student supports (e.g., graphic organizers for each part of the writing process), and another four said that they needed examples of good writing pieces from this activity to share with their students. In general, teachers did not request these materials because they felt unprepared to teach, but because they expect curricula to include these types of student supports. Without them, teachers employed their own practices for helping students with the activities when needed.

The most challenging practice for nearly all the teachers was helping their students work collaboratively. Seven teachers spoke to the challenges of grouping students so that they would work well together. During their interviews, they said that they asked themselves such questions as, *Should I group students homogenously by ability (high achievement vs. low achievement), or should I mix students at different achievement levels? How do I ensure that none of the students in a group will abdicate responsibility, or that one or more students don't take control of the entire activity?* Below are five representative teacher quotes about grouping and collaboration:

> *There are always going to be students who do more than other students. I tried my best to group by ability—two high, two low per group—just as a motivator. High students could assist the low students. But when push came to shove, what naturally happens is the higher performers do more of the work. The writing that the lower performers did was a little bit better because the higher performers were holding them accountable. But I don't think writing collaboratively is an impossible thing to do. I don't discredit it if the right four students were grouped together; just so there's some learning in each group. My fear is that the lower-performing group will do the bare minimum or less, as opposed to different ability groups. Higher groups were the ones that really got into the project. With them, there was a good amount of growth because they asked the right questions and wanted to know if their writing sounded right. I would say about 20 students over my four periods really took ownership of the project and wanted to do well on it.* (grade 7 teacher)

> *They learned that it was hard, because in some cases some students found that giving up some control and responsibility was difficult. But others were giving up their responsibility for the writing. Depending on the group, some had lower students who were willing to work because they had a chance to discuss and check in with the higher students. Some groups had all four students actually working. But they are mostly used to doing a lot of the writing for themselves.* (grade 7 teacher)

> *I haven't had them collaborate as a whole group before—usually it's partners. Sometimes other students help the lower-levels students. Most of them liked working with the group, but the problem is knowing how to work with a group. Learning how to get along and work together is a challenge. One of my top students doesn't have the patience and snapped*

at the other kids . . . I'd say it was about 50/50 of the teacher stepping in and kids figuring it out when there were disagreements. (grade 7 teacher)

They learned that sometimes you have to discuss things, and that's it's okay to disagree. There's a polite way to say that you disagree, and you can't just take the work over. They really need to use that accountable talk. Some of them were using it for this process, and they have to understand why that's important. You don't have to agree, but you need to be able to say why you disagree. (grade 3 teacher)

We had a lot of tears because some kids weren't able to give up control. (grade 3 teacher)

Explanation

None of the teachers reported that they made any significant changes to their practices based on their experiences during the study, though several pointed to features of the mini-unit materials that they liked and would use again in the future, such as the incorporation of different content areas, the checklists, and the class meetings. In general, those teachers who had the most experience with pairing their students to read each other's writing and to give each other feedback were more comfortable with helping their students work together to create products. But about half the teachers did not feel prepared to guide their students through collaboration routines for this type of work and commented that they would like PD, or more materials to help them lead group collaboration activities. For example, one third grade teacher noted,

> *[Collaboration is] hard! It's interesting, though, even in education. We have been trying to learn to do more collaboration. As adults we can do a better job finding what people's strengths are, but it's hard when there's one kid that has all of the strengths. I think it's something we all have to work on together.*

Question 4: How do teachers report that *Fable Writer* impacts their perceptions of technology, writing, and collaboration?

Nearly all the teachers mentioned student access to the *Fable Learning* library and the *Reader* functionality as the most compelling features of the technology. They liked that they could access books instantly and make decisions about which resources should be available to students during an activity.

Teacher perceptions

Four teachers thought that the Thinking Space was a valuable addition—they liked that students could see one another's writing. Several also mentioned that they liked the color coding for student writing, which helped them scan across the Thinking Space to see who was contributing. About the Thinking Space, one middle-grades teacher said, "I think that it helped with the accountability piece. They knew it was accessible to all of

them to see what they had done, and they knew they couldn't take the backseat." Similarly, another middle-grades teacher commented, "The Thinking Space helped, especially in the first couple of days when the software was working. They were showing each other what they were finding."

Most teachers in the study already used Google Docs, another technology that allows for synchronous writing among multiple students (though most do not use it that way). For many teachers, what set *Fable* apart from Google Docs is the *Writer*'s connection to the *Reader* and that students do not have to visit other websites, though some students did during the study because of technical issues with books rendering or because they thought the resources were inadequate for the project. The "all in one" aspect of the *Fable* tools is quite compelling for most teachers, however.

During their interviews, five teachers remarked on the lack of any meaningful tools for them to use within the technology. Several teachers said that they liked being able to scan students' contributions to the Thinking Space or Document as they walked around the room, but that there were no online features that enabled them to sort through (e.g., a space where teachers can quickly and easily sift through and order group documents) or comment on groups' essays. Similarly, two teachers said that it would have been nice to have the ability to score the essays online. Without that teacher functionality, "it's really not that different from Google Docs," one third grade teacher said, adding, "I'm not sure what the value added is if there aren't additional tools for teachers to use."

Student perceptions

The library feature of *Fable Reader* was especially popular with students, with 83 of the 270 students (31%) mentioning positive aspects of the library in their student survey comments, making it the top theme across all student survey comments. These students said that they enjoyed reading books online, and they liked the books they were able to access. One Pine Grove *FW* student wrote, "What I liked most was having books on the website."

However, 54 of the 270 students (20%) pointed out challenges they encountered with the library. For example, students would like more of the resources to have the "read to me" feature. One third grade student explained, "The thing [I] liked least about *Fable Reader* is that some of the books you can't hear." Students' comments also suggest that the library needed a broader range of titles that related specifically to their topic and accommodated different levels of reading. One middle-grades student suggested, "Add more books and articles that can be used to get good information." Further, some middle-grades students thought that the titles available to them were below their reading level: "It was mostly little kid stories."

Other comments from the student surveys addressed the use of technology in the class more generally. "Using more technology than usual" during the study period was a top theme overall across schools, mentioned by 74 of the 270 students (27%). Comments suggest that teachers in some schools were using technology more than others prior to their use of the *Reader* or *Writer*. Thirty-two of the 54 Oak Bluff students (59%) mentioned that they used more technology than usual during the study, making it one of the top themes at that school. This was also a top theme at Hamilton, where it was mentioned by 17 of the 43 students (40%). These students noted that they usually read paper books and wrote by hand in their language arts classes. One Oak Bluff *FW* student wrote, "On *Fable Writer* you get to type and use virtual books instead of paperback books."

"Using more technology than usual" was not a top theme at Pine Grove, where 31 of the 155 students (20%) said that *Fable Reader* and *Fable Writer* were different from the other technology they ordinarily use in the classroom. Many of these students mentioned that they often use computers for reading, writing, and research, but pointed out some features of *Fable* that are different from the technology they normally use. For example, one student wrote, "This was a little different because we always use computers but we don't have colors for what we wrote."

Question 5: How do teachers report that *Fable Writer* impacts students' perceptions of collaboration and collaborative writing?

Teacher perceptions

Most teachers thought that their students ultimately enjoyed the experience of researching and writing together—when the technology was working—and that they were exposed to valuable routines (such as making decisions together about what draft material to include in the final paper). When asked whether they thought *Fable Writer* helped or hindered collaboration among students, only two of the eight *FW* teachers (both grade 7) believed that it hindered collaboration, because of the technology failures. One teacher commented, "It helped, especially in the first couple of days when the software was working . . . they were showing other students what they were finding."

A majority of teachers (six of the eight) agreed that working collaboratively (as opposed to independently but cooperatively) with *Fable* technology posed some type of challenge for their students, but especially for third-graders in the *FW* groups. Producing collaboratively written products using the *Fable* tools requires the use of a range of complex literacy and social-emotional skills. **Interviews with teachers, along with our classroom observations, revealed three primary challenges and one secondary challenge to collaboration during this project. As we discuss below, however, many**

students' survey responses indicate that these challenges did not necessarily lead to negative perceptions about collaboration.

The first primary challenge was an assumption about the literacy skills necessary to complete the unit. The project required students to work together to produce an argumentative (grades 6–8) or informational (grade 3) writing piece, using evidence from their readings. Five teachers (two grades 6–8 teachers and three grade 3 teachers) explained that their students had little previous experience with argumentative or informational writing, nor with reading to find evidence, because they had not yet focused on those topics in class. As one middle-grades teacher noted, "I think the lesson overall didn't take into account what students were capable of. We hadn't gotten to argumentative writing in the year." A middle-grades teacher explained, "They are still working on their writing skills . . . They haven't done that much in terms of research." She added, "There were a lot of things that they'd never done before . . . This lesson seemed to be going off the assumption that students have the background in this kind of writing."

This challenge was due in part to the timing of the study. Given reporting requirements and some recruiting challenges, data collection had to occur in February, regardless of whether students and their teachers had started practicing particular reading, writing, and research skills. But it does suggest the possibility that it will be more difficult for students to work collaboratively on certain writing tasks if they do not have prerequisite skills. Students' lack of experience with the literacy skills and practices required for argumentative and informational writing sometimes made it difficult for groups to determine how to divide tasks and then merge their separate writings, and how to make decisions about what to research for their pieces.

The literacy skills that teachers thought were necessary and that at least some of their students had not yet mastered included the following:

- Finding information relevant to an argument in texts (grade 7)
- "Translating" information from a text into supporting statements for an argument (grade 7)
- Understanding what an *argument* is, as opposed to other forms of writing (grade 7)
- Distinguishing between *valid* and *invalid* sources (grade 7)
- Agreeing on a writing topic (grade 3)
- Identifying and using information from multiple sources (grade 3)
- Typing long writing pieces (grade 3)
- Understanding citations (grade 3)

The second primary challenge related to students' and teachers' relative lack of experience with and opportunities to practice the social-emotional skills necessary to create writing products together. By social-emotional skills, we mean the skills and attitudes necessary to set goals, manage relationships with other students, and make responsible decisions with respect to groupwork. All 12 teachers in the project—both *FW* and *FR*—noted the challenges that students faced when creating collaboratively written documents.

The difficulty began with many students' general lack of experience with collaborative projects in class. Most of the participating teachers did not have their students collaborate on a regular basis. When asked to give examples of "a time your students had to collaborate or work together to take notes," only two teachers provided vague references:

> *They have collaborated on projects but not a lot this year. Quite a bit in math. But not here. Behavior is a key piece which keeps us from doing much collaboration.* (grades 6–8 teacher)

> *They have* [collaborated] *a little bit. If reading a piece of literature, each group reads a section and then they collaborate together and share it out. But not a lot.* (grades 6–8 teacher)

Without a foundation of experiences and routines from which to build the skills of collaboration—including working effectively and respectfully with others, assuming shared responsibility for work, and valuing each individual's contributions to the work—it is unlikely that many participating students would be able to apply collaborative writing strategies consistently.

When asked about "two or three of the biggest challenges your students had while using *Fable Writer*" and "what . . . your students learned about 'collaborative writing' during this experience," four of the eight *FW* teachers and two of the four *FR* teachers mentioned the difficulties of collaboration. In *FW* groups for both grades 3 and 6–8, several teachers commented that some students became so frustrated that they either produced their own work independently (sometimes at home), or they unilaterally made decisions to change the group's work in the Thinking Space or the Document, without asking their group members.

The third primary challenge related to a lack of scaffolding to support collaboration. The classroom materials for grades 3 and 6–8 included printed guidance for students and teachers on how to work collaboratively, but as we noted above, teachers sometimes skipped those activities because of time pressures. Further, the *Fable* tools do not include built-in scaffolding to encourage students to collaborate. In the Thinking Space,

for example, it is easy for students to work in parallel most of the time—there are no prompts to encourage students to stop and reflect on their work and their level of collaboration, or to plan how to integrate the group's various writings.

During their interviews, 6 of the 12 teachers asked for more scaffolding. These requests typically related more to traditional literacy skills, for example:

- Identifying claims, evidence, and an author's reasoning (or intent) in texts
- Pointers for distinguishing relevant from irrelevant information
- Guidance on how to structure an argumentative essay
- Examples of well-written and poorly written collaborative writing pieces

But several teachers also had suggestions for scaffolding within the technology to support collaboration, for example:

- Rather than have a single Thinking Space, give each student in a group his or her own Thinking Space, while still allowing them to see one another's writing
- Offer built-in steps in the Thinking Space and Document that give students specific prompts about when to turn and talk with one another about their contributions
- Provide a tool to help students create their own references to texts (unlike the current automatic citations, which did not work during the study)

A fourth (secondary) challenge to collaboration was the technical difficulties associated either with a school's network or bugs in the *Fable Writer*'s functionality. When asked about "the biggest challenges your students had while using *Fable Writer*," seven of the eight *FW* teachers referenced students' difficulties with logging in to the Fable site and the bugs associated with the *Writer* technology. Four of those seven teachers had their students take notes and draft their pieces in Google Docs for at least part of the project because the challenges became so significant. One grade 7 teacher explained,

> *Just getting onto the website itself* [was a challenge]. *We ran into a lot of problems with the Thinking Space and Document area. I'm not sure if there were Internet issues. It took a long time and ate up class time and work time. The problem with the Thinking Space was that they'd log in but wouldn't have access, so we had to find a way to access it. We did find a work-around—if they had problems, I ended up just having students finish up in Google Docs. The writing was too much of a problem for us to continue trying . . . Being able to apply copy and paste and cropping was a nice feature, but they weren't able to test them out because it wasn't functional most of the time.*

Three of the 12 teachers (two *FW* and one *FR*) specifically noted that they thought that many students enjoyed the overall experience of researching and writing together. One

FW teacher said, "They learned to share and to respect each other's opinions to work together and help one another. They became confident as writers and collaborators." The other commented,

> *I think that they learned a lot about and enjoyed peer editing. Today we were in Google Docs and they were asking each other questions and they were going through their thinking process, which was helpful for them.*

The *FR* teacher agreed, saying, "I think most saw it as a good thing. They liked being able to see the different writing styles of others."

Student perceptions

According to the responses from student surveys, students in the *FW* groups in grades 3 and 6–7 showed slightly more positive opinions about collaboration, as compared to the *FR* groups. In grade 3, 54% of *FR* students agreed that "*Fable Reader* made me more interested in working with others" ($n = 41$), while 63% of *FW* students agreed with this statement ($n = 91$). While grades 6–8 students tended to have more negative attitudes toward collaboration than grade 3 students overall, students in the grades 6–8 *FW* groups still had more positive perceptions than their peers in the *FR* group. In grades 6–8, 22% of *FR* students agreed that *Fable Reader* "made them more interested in working with others" ($n = 23$), compared to 34% of grades 6–8 *FW* students ($n = 155$).

Based on their survey comments, students in the Oak Bluff *FW* group seemed to particularly enjoy the collaborative aspects of the tool, even if they were not always successful in their collaboration (according to researcher observations). Sixteen of the 34 students in this group made positive comments about collaboration in their surveys, making it a top theme for that group. These students described group work as a fun way to write that was different from their everyday writing practices, particularly when they were able to work with their friends. One student said, "I like how you can work as a team and write at the same time. It's a more fun way of learning on computers."

As we noted under Teacher Perceptions, many students also seemed to generally enjoy the reading, writing, and content learning they did with the *Fable* tools, which was one of the top five themes overall (mentioned by 59 of the 270 students) and was also a top theme across the Oak Bluff and Hamilton classrooms (cited by 22 of 54 and 23 of 43 students, respectively). Students said that they enjoyed their experiences reading, writing, and learning about subjects such as animal adaptations. As one student commented about what she liked, "We got to learn about a nonfiction topic."

Additional data from student surveys are available in Appendix D (p. 53).

Question 6: How do teachers report that *Fable Writer*'s teacher supports impact their implementation of collaborative research and writing?

Most teachers felt prepared to use the *Fable* technology with their students, but many reported that they were not adequately prepared to teach the mini-units or to help their students write collaboratively. During the exit interviews, we asked teachers four questions about their experiences with *Fable* PD: (1) How useful was the PD in terms of preparing teachers to use the *Fable* technology? (2) How useful was the PD with respect to preparing teachers to teach the unit? (3) How useful was the PD for preparing teachers to help their students write collaboratively? (4) What changes would teachers like to see made to the PD?

Preparing teachers to use the technology

Most teachers (7 of the 12) reported that the PD was "useful" for preparing them to use the *Fable* technology (either the *Reader* or the *Writer*). One teacher said, "[The PD] seemed to work well. I understood how to access [the technology] and present the materials. It was very clear." Another teacher noted that the PD was an opportunity to build momentum going into the study; as one teacher said, "It got the ball rolling." However, some teachers thought that the training to use the technology was insufficient, and several teachers at Hamilton were especially frustrated by the technical difficulties with logging in during the training session. Half the teachers thought that functions related to creating student groups and log-ins were explained inadequately.

Preparing teachers to teach the unit

Four of the 12 teachers (3 *FR* and 1 *FW*) said that the PD prepared them to teach the unit. One *FR* teacher commented, "It was useful. I liked that I had access to the materials before the webinar so that I could pre-load the materials and get a sense of the project." Two other teachers also reported that they liked having materials in advance of the training. However, seven teachers said that they were not prepared to teach the unit coming out of the PD. Several thought that the Fable staff did not do enough modeling of specific classroom routines during the training. For example, one teacher said,

> *The PD could be improved upon. A lot of the information they gave us about teaching the unit was too free-form for the teacher. It was like, "Talk about this idea or talk about that idea." Well what should I say about that idea? I had to do my own research and use other things I'd used in class before. I felt the talking points on working collaboratively were really good and useful, but a lot of times the talking points about getting kids to edit their writing weren't detailed enough.*

Two teachers thought that the PD time would have been better spent going through a specific lesson as their students might, so that they had a better understanding of the activities and the technology.

Ten teachers said that the PD did not make it clear how much time the unit would take to teach. As one teacher commented, "It made it seem like it was easy, but it was really long and drawn out. The expectations were a bit misleading when presented to us. The lessons were easy to follow but long." Another said, "Introducing the overall objectives of what you're doing would be good. You need an overall clear picture about the project. And they should have said there's actually 30 lessons, not 10."

Preparing teachers to help students to write collaboratively

Two of the 12 teachers reported that the PD provided "good talking points" for helping their students write collaboratively, and another two teachers said that the project checklists were useful aids for their students. One teacher said, "The collaboration timeline and project overview and guidelines were extremely helpful." About the timeline, one teacher said, "The parts where it says, 'This is what you're supposed to be doing today' piece were very helpful. Our kids didn't use them well, but for me they were helpful." But 10 teachers reported that the PD could have been more helpful in this respect. Seven of those teachers could not remember covering the topic of *collaborative writing routines* during the training.

Suggestions for changes to the professional development

While all teachers reported that some aspect of the PD was helpful, several had suggestions for how to make it more useful for future teachers, for example:

- *Modeling:* Three teachers reported that the PD would have been more helpful if Fable staff modeled a lesson with the teachers, with the teachers playing the role of students.
- *Exemplar writing products:* Four teachers mentioned the need for writing samples as important references for teachers and students. One teacher said, "Having a sample would have been helpful for us. As teachers, we look at what the end point [for an activity] is supposed to look like and then work backwards." Teachers wanted to show their students what a well-done final product looks like.
- *Managing expectations about the time needed to teach the mini-units:* Several teachers reported that there was a mismatch between the time in which they were expected to get through the material and the volume of materials in the mini-units. They suggested that Fable staff tell teachers that it will take at least 20 periods to teach the mini-units in full.

DISCUSSION

Collaborative writing was a new activity for nearly every teacher and student in this study. By and large, engaging in "an iterative and social process that involves a team focused on a common objective that negotiates, coordinates, and communicates during the creation of a common document" (Lowry, Curtis, & Lowry, p. 72) is something that most of these students do not currently do in school. While many teachers reported that they regularly have their students cooperate during projects and, in some cases, edit one another's writing and offer feedback, the observation and interview data from the study suggest that most students do not engage in the planning, discussion, compromise, and coordination that are necessary to produce collaboratively written materials, nor do teachers teach them routines to do so.

Despite significant challenges imposed by frequent technical failures in most classrooms, and mini-units that took far longer to implement than any of the teachers expected, all 12 teachers said that they would use the *Fable* tools again in the future and that they saw the value of teaching their students to collaborate on writing projects. Students, too, expressed an interest in working with their classmates using *Fable*. As we noted above, students in the *FW* groups in grades 3 and 6–8 showed slightly more positive opinions about collaboration than did their peers in the *FR* groups. While grades 6–8 students had somewhat more negative attitudes toward collaboration, the students in the grades 6–8 *FW* groups still had more positive perceptions than their peers in the *FR* group.

To summarize the major findings:

- All 12 teachers said they would use the *Fable* tools again in the future because they saw the value of teaching their students to generate, negotiate, compromise around, and express ideas together. They also realized how challenging it is to establish routines for facilitating those activities.
- The "all in one" quality of the *Fable* digital tools appealed to most teachers because they could lessen the distraction of competing online sites and allow teachers to have their students focus on a select set of resources. Teachers remarked that the convenience of having research materials (i.e., the materials in the *Fable Reader* library) and a writing tool together, in one online location, had the potential to make future instruction easier because teachers and students might spend less time switching between technologies or searching for resources from different locations on the Web.

- About half the teachers did not feel prepared to guide their students through collaboration routines for this type of work and indicated that they need PD and scaffolded student materials to help them lead group collaboration activities.
- There were three primary challenges to implementation of the *Fable* technology and materials: (1) the need for existing literacy skills required to complete challenging assignments, (2) students' and teachers' relative lack of experience with and opportunities to practice the social-emotional skills necessary to create writing products together, and (3) the need for scaffolded student materials to support collaboration among students. A secondary challenge was the many technical difficulties that students and teachers encountered when working with the *Fable* tools.
- Grades 6–8 students tended to be less enthusiastic about writing together than the elementary students, but those students who used *Fable Writer* preferred collaboration more than the students who worked only with the *Reader*, suggesting that the *Writer* contributed to their appreciation for collaboration. However, there were several instances in which an individual *FW* middle school student departed from the group to complete his or her work independently.
- Even though a majority of third grade students indicated that they liked writing together, we observed several instances in which individuals and whole groups of students were frustrated because they could not agree about what to write or how to assign different responsibilities. Three of the third grade teachers thought that, from a developmental perspective, collaboration was very challenging for students at this age.
- Individual teacher's practices were the most significant factor in influencing students' collaboration routines and writing products, rather than any particular features of the *Fable* technologies. Those teachers who had more experience with (1) paired writing routines and (2) discussion routines (e.g., "turn and talk" or "think-pair-share") were more successful in leading the *Fable* activities.

We conclude that teachers' practices are the most significant factor in terms of influencing students' collaboration routines and writing products, rather than any particular features of the *Fable* technologies. Given the technical challenges, lack of built-in supports for collaboration, outcomes of the writing products, and teachers' and students' reflections, there is little reason to believe that the *Writer* functionality contributed meaningfully to the quality of students' collaboratively written products.

Our analyses of the student essays found that stronger essays tended to come from classes where teachers had more experience with teaching writing and with having students substantively engage with one another's products through peer editing and

feedback. One *FW* teacher at Hamilton and one *FW* teacher at Blue Springs—the classes that drove up the *FW* condition scores at each school—reported that they had a lot of experience with project-based learning and that they had established routines for helping students work together. Those routines were evident during our observations. They were also evident in the *FR* classroom at Oak Bluff, where the average essay scores were higher than the scores of their *FW* counterparts.

Our observations and interviews, as well as students' responses to surveys and teachers' weekly logs, left us with these additional conclusions:

- Grade 3 students were especially interested in writing together, despite the technical challenges.
- Grades 6–8 students were less enthusiastic about writing together, but the *FW* students preferred it more than the *FR* students, suggesting that the *Writer* contributed to their appreciation for collaboration.
- All the teachers saw value in having their students collaborate—some for reasons of having students support one another, and others because they believe it is important that their students learn to cooperate and compromise to produce materials.
- Very few teachers felt prepared to help their students collaborate, and few thought that the PD helped them learn to do so.
- Most teachers thought that the mini-units were too complex and too long. Several grade 3 and grades 6–8 teachers suggested that the materials were not developmentally appropriate.
- Most teachers and students appreciated the link between the *Reader* and *Writer* technologies, though many did not have opportunities to experience their benefits for sustained periods because of the technical difficulties.

RECOMMENDATIONS

We have four key recommendations as to how Fable might improve its technology, teacher materials, and PD in order to help teachers and students establish collaborative writing routines.

1. Expand professional development offerings on collaboration routines and literacy skills.

Many teachers felt inadequately prepared to help their students integrate the literacy and social-emotional skills necessary for engaging in collaborative writing. Fable can create lessons that are shorter and more focused than the existing mini-units to help

teachers and students practice these routines without necessarily engaging with large amounts of content. Future PD could model the types of routines that will help students work together to (1) identify topics of interest, (2) plan for research in the *Fable Learning* library, (3) divide work among themselves, (4) respectfully discuss findings and alternative points of view, (5) resolve disputes, and compromise on final writing products, and (6) integrate one another's ideas—or fully justify reasons for excluding them—in the final Document. PD could also strengthen teachers' abilities to build certain literacy skills among their students, such as identifying claims and evidence in written work; distinguishing between primary and secondary ideas; and identifying relevant ideas across multiple resources, including websites, videos, and written documents.

2. Provide more student scaffolding for collaboration routines.

Several teachers requested scaffolding (i.e., worksheets, graphic organizers, numbered steps) to help students practice the collaboration routines we discussed above. Many of these scaffolds could be integrated into *Fable Writer* to help students as they work with this digital tool. The scaffolds might include built-in prompts for students to stop periodically to discuss their work with one another; checklists for students to use as reminders of the different tasks and routines for which they are responsible during collaboration and writing; and general guidance on best practices for collaborative work, such as how to acknowledge one another's ideas, how to integrate multiple ideas into themes, and how to compromise in order to produce final writing products.

Many teachers commented that they liked the checklists that are already included in the teaching materials. Those checklists could be adapted to fit different teachers' and students' needs (e.g., simplified checklists for younger students), and made available to students from within the Thinking Space and the Document so students can remind themselves of their responsibilities.

3. Improve teacher-facing functionality around collaboration routines and student work.

The current version of the *Writer* tool has extremely limited functionality for teachers. Providing the scaffolds listed above for teacher-facing materials will help teachers engage their students in better collaborative experiences. Fable might also consider building in additional prompts for teachers, for example, prompts that indicate where and when in a lesson teachers pause to ask a question; when and how to redirect students, based on their behaviors or responses to questions; and when to have students "turn and talk" during collaboration routines.

Teachers would like to have the ability to look at all of their students' work (individually and in groups) via a sortable, digital report. They would like to be able to make comments, ask questions, and point students toward particular resources or built-in routines directly within the Thinking Space or Document functionalities within the *Writer*. Teachers should also be able to grade student work from within the *Writer* tool, using built-in rubrics.

4. Focus on the core educational objectives for writing and collaboration.

Several teachers thought that the current mini-units were too complicated. In the future, these existing mini-units could be used (with modifications) as "advanced" units for classes that have considerable experience with collaborative writing. Fable could consider producing a set of initial, simpler activities to provide an introduction to collaborative writing routines—"one routine per lesson," for example, that can be completed in one or two regular class periods. Similarly, Fable could create targeted lessons to help address the literacy skills we mentioned above.

ADDITIONAL CONSIDERATIONS

In their surveys, students pointed out several technical challenges, many of which we have already raised in the body of the report:

- Lag issues were one of the top five themes overall, cited by 58 of the 270 students—a large majority of whom (53, out of 140 total) were in the *FW* Pine Grove classrooms. Students commented about the slowness of the website; for example, an *FW* Pine Grove student said, "I didn't like how slow it loaded." At three of the four sites, teachers and students faced log-in issues (e.g., access not granted). There were also connectivity issues with books not rendering at three of the four sites.
- Access problems were also a top theme in the *FW* Pine Grove classrooms (cited by 37 of the 140 students), with a number of students stating that they had trouble loading the site. One student wrote, "We had a lot of problems trying to get onto the site."
- Usability problems with the *Writer* was a top theme across the Pine Grove classrooms (cited by 31 of 140 students), with students frequently citing confusion around navigation. One *FW* student commented, "It was hard to find out where to go and sign in."
- "General technical problems" was one of the top five themes overall (cited by 55 of the 270 students), and one of the top themes for the *FW* Oak Bluff, *FW* Blue

Springs, and *FW* Hamilton classrooms (cited by 15 of 34, 7 of 9, and 11 of 21 students, respectively). Students either described general "glitches" or mentioned the backspace bug in particular. An *FW* Hamilton student commented, "The worst part is all the glitches with backspace, because every time I try to backspace something it glitches."

Students also recommended changes to the technology. The following recommendations were each mentioned by at least two students:

- Expand the resources and selections available in the *Fable Learning* library—offer books and articles on more topics, and have more texts appropriate for grades 6–8. (Fifty-four of the 270 student survey respondents made negative open-ended comments about the library, mostly about the selection of books.)
- Expand the "read to me" feature to all the books in the library, which was specifically suggested by seven students.
- Four students would like to see improved or advanced search and research functions. For example, students would like "to have a specific criteria search so people can find close to exactly what they are looking for."
- Three students requested improvements to the mini-units, such as giving students more instructions for the projects, and devoting more time to the research.
- Two students wanted more help with spelling. For example, one said, "Make it so there is a button you could press on the screen that will show you words you might be trying to spell."
- Two students would like more help features. For example, include more help links and give students more explanations around the read-aloud and auto-read features.
- Two students suggested changes to the color-coding feature—adding more color choices and making the colors less bright.
- Two students requested that the image functions be expanded—having a selection of searchable images, and allowing students to add images from other websites.

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APPENDIX A: *FABLE WRITER* OBSERVATION PROTOCOL, SINGLE GROUP

School name: _____

Date of observation: _____

Researcher name: _____

Students in Group 1: _____

Students in Group 2: _____

Overview for the researcher:

This protocol is to guide your observations of one or two groups of students during your school visit. **You should observe the same group(s) of students for ALL THREE of your visits to the school.** Plan to sit with a group for 10–15 minutes so that you can see and hear enough about what they're doing in order to use the table in question 7 below.

The goal is for you to describe *the types of collaborative activities* the group engages in during each of your three visits. As much as possible, use the definitions of the activities as they are listed in questions 2 and 4 so that we have some level of standardization across the schools.

Please have at least two copies of this protocol with you for each visit so that you have it available for note-taking on more than one group.

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1. **Which activity/session are you documenting (use the title from the activity guide)?**

2. **What was the MAIN ACTIVITY that your group of students worked on during the observation today?** (Note: This might be based on a specific direction from the teacher, or because it's what the group decided to do on their own. For this checklist, it's irrelevant—just check the box that most closely captures the main activity, irrespective of where the direction comes from.)

   If it isn't obvious after 2–3 minutes, then ask at least two students: *What are you working on right now? What's the goal for what you're doing right now?*

   - ☐ *Brainstorming*—developing ideas for a paper draft
   - ☐ *Converging on brainstorming*—deciding what to do with the brainstormed ideas as a group
   - ☐ *Outlining*—creating a high-level direction in which the document will be going, including major sections and subsections
   - ☐ *Drafting*—writing the initial incomplete text of a document (note that this includes inserting images, writing captions, etc.)

- ☐ *Reviewing*—having a participant or an editor read and annotate document draft sections for content, grammar, and style improvements
- ☐ *Revising*—making changes to the draft in response to the reviewer's comments
- ☐ *Copyediting*—making final changes that are universally administered to a document to make a document more consistent
- ☐ *Other* (please describe)_____

3. **Describe what it is that students said and did that provides evidence of the main activity:**

4. **Did the MAIN ACTIVITY occur due to teacher direction?**
   - ☐ *Yes* (Describe the instruction. E.g., the teacher said, "This is what you'll do in group . . ." or she wrote it as a Do Now): _____
   - ☐ *No* (Explain why it occurred. E.g., At the beginning of class, the group said, "Okay, let's start outlining the final document today"): _____

5. **What were the SECONDARY ACTIVITIES that your group of students worked on during the observation today?** (Note: Check all that apply; see definitions above if you need to. Secondary activities should include any activities *other than the one* that students spent the most amount of time on or that they told you were the most important.)
   - ☐ *Brainstorming*
   - ☐ *Converging on brainstorming*
   - ☐ *Outlining*
   - ☐ *Drafting*
   - ☐ *Reviewing*
   - ☐ *Revising*
   - ☐ *Copyediting*
   - ☐ *Other* (please describe)

6. **Describe what it is that students said and did that provides evidence of the secondary activity:**

7. **In the table below, check the PREDOMINANT strategy that the group used during the MAIN ACTIVITY today** (check one only):

	Strategy	Description	Meaning that . . .
❑	Parallel construction: "cut and paste"	Each member of the group works on a different part of the task. The final document is constructed by connecting the different parts, without contribution from the other co-authors.	Control and responsibility for the work are independent—group members work separately on a part of the document and only have control over and responsibility for their own part of the writing process. In the end, they simply paste their parts together.
❑	Parallel construction: "puzzle"	Group members each contribute their own document, with the entire task entirely or partially completed. The final document is then constructed by connecting pieces of the contributions from each co-author.	Same as above, except that in the final part of the writing process, control and responsibility for producing the document falls to one person who is responsible for completing the document
❑	Sequential summative construction	One group member presents a document that is either a draft, partial, or complete proposal for the task. The other co-authors then add their own contributions to this document, without modifying what was written previously.	Group members take turns having control and responsibility for the writing product and doing the writing
❑	Sequential integrating construction	Same as above, except that as other group members add their own contributions to the document, they propose modifications or discuss whether they agree or disagree with what was previously written.	Control and responsibility are shared. Group members have successive and equitable access to the document and take turns doing the writing.
❑	Integrating construction	Occurs synchronously through ongoing discussion—with repeated revisions—where all group members react to one another's comments, changes, and additions.	Control and responsibility are shared and distributed among group members.

8. **Describe what you saw or heard that provides evidence of the predominant strategy for the main activity.** (Note: Describe how the students decided on this strategy—based on teacher instructions; because a student suggested it; etc.)

9. **In what ways—if any—did students use the features of *Fable Writer* to carry out this strategy?** (Note: Be as specific as you can about which features, and how a student used them)

10. **In what ways—if any—did the features of *Fable Writer* impede students from carrying out this strategy?** (Note: Be as specific as you can about which features, and how a student used them)

11. **Other notes:**

APPENDIX B: GRADE 3 ESSAY RUBRIC

Category	Score			Additional considerations
	3	2	1	
1: Headings are well – chosen and organized	Headings support meaning/organization	Headings are present but don't support meaning/organization	No headings	
2: Paragraphs maintain the focus on the question	Paragraphs are mostly on-topic	There is a mix of on-topic and off-topic paragraphs	Paragraphs are mostly off-topic	
3: An inviting lead captures reader interest	Lead invites interest	There is a lead, but it does not invite interest	No lead	
4: Precise vocabulary that reflects meaning is evident	Technically precise terms are used three or more times	One or two technically precise terms are used	No technically precise vocabulary	*Precise vocabulary*: specific to domain, not in common usage
5: Visuals support the content	There is more than one visual that supports content	There is only one visual, or visuals are used but don't support content	No visuals	
6: Page layout is well-planned, with text features such as bold text, page breaks, title, About the Authors page, and/or Glossary to support meaning	There are two or more text features that support meaning	There is only one text feature, or text features don't support meaning	No text features	
7: Table of Contents is included	Table of Contents is used correctly	Table of Contents is used incorrectly	No Table of Contents	
8: A powerful conclusion to the book brings closure	Conclusion summarizes text and/or provides closure	Conclusion does not summarize text or provide closure	No conclusion	Conclusion should be a separate paragraph

APPENDIX C: GRADE 7 ESSAY RUBRIC

Category	Score			Additional considerations
	3	2	1	
Text Feature 1: An inviting lead captures reader interest	Lead invites interest	There is a lead, but it does not invite interest	No lead	Questions are always inviting
Text Feature 2: Visuals support the meaning and include captions or labels (caption must support meaningfulness)	Two or more visuals support meaning and include captions or labels	There is only one visual, or visuals don't support meaning, or there are no captions or labels	No visuals	
Text Feature 3: There is a compelling and memorable conclusion	Conclusion is relevant, compelling, and memorable	Conclusion is not compelling and memorable, or is not relevant	No conclusion	
Argument 1: Problem and its importance are explained	Problem and its importance are explained clearly	Problem is clear, but its importance is not or is unclear	No problem	Problem should be stated near beginning
Argument 2: Background information / context is given for arguments	Relevant context is given for arguments consistently	Context is not relevant or is inconsistent	No context	Consistent means MORE than half
Argument 3: Arguments include claims, reasons, and evidence	Arguments consistently include claims, reasons, and evidence	Arguments include two of the three elements consistently	Arguments include zero or one element consistently	Consistent means MORE than half
Argument 4: Different kinds of evidence (facts, quotations, definitions) are used	Two or more kinds of evidence are used throughout	Only one kind of evidence is used throughout	Most arguments do not include evidence	
Argument 5: Is organized to make a strong case and to lead reader from one claim, reason, or evidence to the next	Is organized to make a strong case consistently	Some clear organization is present in arguments	No organization is present in arguments	Consistent means MORE than half
Argument 6: Includes at least one counterclaim, and refutes with evidence	There is at least one counterclaim with evidence to refute it	There is at least one counterclaim but no evidence to refute it	No counterclaims	Has to have evidence, not just refutation
Argument 7: Headings, topic sentences, and conclusions are used to highlight most important claims	At least two text features highlight important claims consistently	One text feature is used to highlight claims, or claims are highlighted inconsistently	No important claims are highlighted	Consistent means MORE than half

Category	Score			Additional considerations
	3	2	1	
Argument 8: Specific technical vocabulary relevant to argument is used	Technical and relevant terms are used four or more times	Technical and relevant terms are used two to three times	Technical and relevant terms are used once or never	
Checklist Item 1: Aimed at appropriate audience (NASA)	Yes / No		Needs to be somewhere near the beginning	
Checklist Item 2: Includes cover page	Yes / No			
Checklist Item 3: Includes Table of Contents	Yes / No			
Checklist Item 4: Includes Glossary	Yes / No			
Checklist Item 5: Includes References	Yes / No			

APPENDIX D: STUDENT SURVEY RESPONSES

Table 11: Grade 3 student reactions to *Fable Reader*

	I agree %	*I can't decide %*	*I disagree %*
Fable Reader was fun to use. (*n* = 41)	88*	7	5
Fable Reader was easy to use. (*n* = 42)	86	7	7
I would like to use *Fable Reader* again. (*n* = 42)	79	14	7
Using *Fable Reader* helped me understand the English Language Arts topic that my group wrote our essay about. (*n* = 42)	76	14	10
Using *Fable Reader* made me more interested in reading about the topic that my group wrote our essay about. (*n* = 42)	69	14	17
Fable Reader made me more interested in researching. (*n* = 41)	61	17	22
Fable Reader let me learn in a way that met my needs. (*n* = 42)	60	21	19
Fable Reader made me more interested in working with others. (*n* = 41)	54	22	24

* Percentages are rounded.

Grade 3 students found the *Fable Reader* highly engaging and appealing:

- 88% of students indicated that *Fable Reader* was fun to use (*n* = 42)
- 79% of students said they would like to use *Fable Reader* again (*n* = 42)
- 69% of students indicated that using *Fable Reader* made them more interested in reading about the topic their group wrote its essay about (*n* = 42)
- On average, students used *Fable Reader* easily, although 60% of students reported that using it was "sort of different from how we usually do research in this class"

A much larger percentage of grade 3 and grades 6–8 students in the *FR* group reported that the tool was easy to use (86% and 71%, respectively) than did their grade 3 and grades 6–8 peers in the *FW* group (34% and 37%, respectively). It may be that students in the *Reader*-only group were more comfortable with the design of the tool and found it fairly easy to navigate since they did not have to learn to use the additional features of the *Writer*.

Table 12: Grade 3 student reactions to *Fable Reader* and *Writer*

	I agree %	*I can't decide %*	*I disagree %*
Fable Writer was fun to use. (*n* = 90)	77*	14	9
Using *Fable Writer* made me interested in writing about the science topic that my group wrote the final essay about. (*n* = 91)	58	24	18
Fable Writer made me more interested in working with others when I write. (*n* = 91)	63	19	19
I would like to use *Fable Writer* again. (*n* = 90)	57	23	20
In the future, I would like to use *Fable Writer* in this class, instead of the way we usually write. (*n* = 91)	57	19	24
Using *Fable Writer* made me more interested in reading about the science topic that my group wrote our essay about. (*n* = 91)	55	30	15
Fable Writer let me learn in a way that I like. (*n* = 91)	55	24	21
Fable Writer made me more interested in writing. (*n* = 91)	45	25	30
Fable Writer was easy to use. (*n* = 92)	34	32	35

* Percentages are rounded.

- 77% of students said that *Fable Writer* was fun to use (*n* = 90)
- 63% of students said that *Fable Writer* made them more interested in working with others when they write (*n* = 91)
- 82% of students said they like using *Fable Writer* (*n* = 93)

A greater percentage of *FW* users in grade 3 indicated that *Fable Writer* was fun to use (*n* = 90, 77%) compared with grades 6–8 *FW* users (*n* = 152, 28%). Results also showed that student enthusiasm was very low among the grades 6–8 *FW* group. Asked if they would like to use *Fable Writer* again, only 21% of students reported that they would (*n* = 150). This may be due to students' lack of interest in the content and/or that they felt less motivated to engage with the tool.

Table 13: Grade 7 student reactions to *Fable Reader*

	I really agree OR *I sort of agree* %	*I neither agree nor disagree* %	*I really disagree* OR *I sort of disagree* %
Fable Reader was easy to use (*n* = 24)	71*	17	13
Fable Reader let me learn in a way that met my needs (*n* = 24)	38	25	38
Fable Reader was fun to use (*n* = 24)	29	25	46
I would like to use *Fable Reader* again (*n* = 24)	25	33	42
Fable Reader made me more interested in researching (*n* = 24)	25	25	50
Fable Reader made me more interested in working with others (*n* = 23)	22	22	57
Using *Fable Reader* made me more interested in reading about the topic that my group wrote our essay about (*n* = 24)	21	29	50
Next time, I would prefer to use *Fable Reader* to do research instead of the way we usually research (*n* = 24)	17	21	62
Using *Fable Reader* made me more interested in writing about the science topic that my group wrote our essay about (*n* = 24)	13	38	50

* Percentages are rounded.

- 71% of students agreed or "sort of" agreed that *Fable Reader* was easy to use (*n* = 24)
- 21% of students indicated that *Fable Reader* made them <<at least somewhat?>>more interested in reading about the topic that their group wrote its essay about

A smaller percentage of students found the *Reader* tool interesting or impactful. In part, this may be because the research and writing activities are different from what students are used to doing: 46% of students said that using *Fable Reader* to write an essay was "sort of different" from how they usually do research in class.

Just under half (42%) the students "really disagreed" or "sort of disagreed" that they would like to use *Fable* again, and only 25% said that they would like to use *Fable Reader* again. This high percentage might partly be influenced by the many technical difficulties that students encountered.

Table 14: Grade 7 student reactions to *Fable Reader*

	I really agree OR *I sort of agree* %	*I neither agree nor disagree* %	*I really disagree* OR *I sort of disagree* %
Fable Writer was easy to use. (*n* = 155)	37*	20	43
Fable Writer was fun to use. (*n* = 152)	28	27	45
In the future, I would prefer to use *Fable Writer* to write in this class instead of the way we usually write. (*n* = 154)	24	24	52
Using *Fable Writer* made me more interested in writing about the science topic that my group wrote our essay about. (*n* = 154)	25	25	50
Using *Fable Writer* made me more interested in reading about the topic that my group wrote our essay about. (*n* = 155)	27	28	46
Fable Writer let me learn in a way that met my needs. (*n* = 154)	32	29	39
I would like to use *Fable Writer* again. (*n* = 150)	21	23	56
Fable Writer made me more interested in working with others when I write. (*n* = 155)	34	28	39
Fable Writer made me more interested in writing. (*n* = 154)	18	31	52

* Percentages are rounded.

- 25% of students reported that *Fable Writer* made them <<at least somewhat?>>more interested in writing about the science topic that their group wrote its essay about (*n* = 154)
- Only 18% of students indicated that *Fable Writer* made them more interested in writing (*n* = 154)
- Only 21% of students reported that they would like to use *Fable Writer* again (*n* = 150)

In addition, only 28% of students said that *Fable Writer* was fun to use (*n* = 152). Here too, students might have been influenced by the technical difficulties. Seventh grade students also generally used more technologies in class, which might have reduced any novelty effects from the *Fable* tools.

APPENDIX E: SAMPLE WEEKLY TEACHER LOG

Teacher Name:

Which lessons did you teach this week? Select all that apply:

- [x] Lesson 1: Introduce the genre, the project, and the idea that writers plan their work
- [ ] Lesson 2: Beginning research with smart choices
- [ ] Lesson 3: Researchers compare notes often, talking about ideas they are developing
- [ ] Lesson 4: Researchers compare, contrast, and re-categorize information
- [ ] Lesson 5: Argument writers test out their arguments through flash debates
- [ ] Lesson 6: Introducing context to the audience
- [ ] Lesson 7: Writers review, set goals, take charge of their own revision
- [ ] Lesson 8: Attending to references and sources
- [ ] Lesson 9: Considering form as well as content
- [ ] Lesson 10: Evaluating proposals

For *Lesson 1: Introduce the genre, the project, and the idea that writers plan their work,* I

	Yes	No, I didn't have the time	No, I didn't think this was necessary	No, this wasn't relevant to today's lesson
Introduced the project	○	○	○	○
Gave a keynote	○	○	○	○
Read aloud	○	○	○	○
Showed a video clip	○	○	○	○
Explained what NASA proposals are	○	○	○	○
Explained how scientists do research	○	○	○	○
Had students use the Bookshelf	○	○	○	○
Had students keep notes	○	○	○	○
Had students form groups based on shared interest	○	○	○	○
Had groups use the calendar to plan their work	○	○	○	○
Had groups divvy up tasks	○	○	○	○

Change to "Please add anything else that you covered this week, or that you didn't get to cover this week that isn't on any of the checklists above and that you'd like us to know about. Or, make any other comments:

APPENDIX F: TEACHER INTERVIEW PROTOCOL

1. **General impressions and reflections**
    a. How many students are in each class (breakdown of boys/girls)?
    b. What type of classroom is it (regular education, special needs or inclusion, etc.)?
    c. About how many periods did it take to complete the unit?
    d. What are two or three of the best experiences your students had while using *Fable Reader* or *Writer*?
    e. What are two or three of the biggest challenges your students had while using *Fable Reader* or *Writer*?
    f. How does this experience—using *Fable Reader* or *Writer* and the mini-unit—differ from how your students usually do writing projects?
    g. What, if anything, have you learned about "collaborative writing" during this experience?
    h. What, if anything, have your students learned about "collaborative writing" during this experience?
    i. What, if anything, would you change about the technology or the unit to improve their usefulness for learning to write collaboratively?
    j. Given the opportunity, would you use *Fable* again in the future? Why or why not?
    k. Have you done projects that call for collaboration? Any examples of a time your students had to collaborate or work together to take notes?
    l. What do you consider *collaboration* to be? When is it easy, and when is it hard?
    m. Does the software help or hurt with that process?
2. **Impressions of the professional development**
    a. How useful was the PD webinar in terms of learning to use the technology?
    b. How useful was the PD in terms of preparing to teach the unit?
    c. How useful was the PD in terms of preparing you to help your students write collaboratively?
    d. What would you change about the way the PD is conducted, if anything?
3. **Impressions of the technology**
    a. Were there features of the *Fable* tool that were especially helpful for your students? Which ones, and why?
    b. Were there features that were especially challenging for your students? Which ones, and why?
    c. Are there features that you would like to see changed? Which ones, and why?
    d. Did you use any additional technologies (such as Google Docs or Word) to help your students write collaboratively? Which ones, and why?
4. **Impressions of the mini-units**
    a. What did you like about the unit (meaning, the content, the student activities, the mini-lessons, the teaching tips, etc.)? Why?
    b. What did you dislike about the unit? Why?
    c. What would you like to change about the unit? Why?
5. **Professional background**

a. How many years have you been teaching?
b. How often does your class time focus specifically on writing (meaning, writing instruction)?
c. Does your school have any particular initiatives or goals related to student writing? If so, what are they?
d. Is there anything else that you'd like to share with us?

APPENDIX G: SAMPLE STUDENT SURVEY

It will only take about 15 minutes to finish. PLEASE ANSWER AS HONESTLY AS YOU CAN! No one will know that these are your answers (because you haven't put your name down), and you won't hurt anyone's feelings! Thanks again!

For each sentence, say how much you agree with it.

	I strongly disagree (1)	I somewhat disagree (2)	I neither agree nor disagree (3)	I somewhat agree (4)	I strongly agree (5)
Fable Writer was easy to use.	❍	❍	❍	❍	❍
Fable Writer was fun to use.	❍	❍	❍	❍	❍
Using *Fable Writer* made me more interested in writing about the science topic that my group wrote our essay about.	❍	❍	❍	❍	❍
Using *Fable Writer* made me more interested in reading about the topic that my group wrote our essay about.	❍	❍	❍	❍	❍
Fable Writer let me learn in a way that met my needs.	❍	❍	❍	❍	❍
I would like to use *Fable Writer* again.	❍	❍	❍	❍	❍
In the future, I would prefer to use *Fable Writer* to write in this class instead of the way we usually write.	❍	❍	❍	❍	❍
Fable Writer made me more interested in writing.	❍	❍	❍	❍	❍
Fable Writer made me more interested in working with others when I write.	❍	❍	❍	❍	❍

Finish this sentence: "Using *Fable Writer* to write an essay for this class is . . ."

- ❍ Very different from how we usually write in this class
- ❍ A little different from how we usually write in this class
- ❍ A little similar to how we usually write in this class
- ❍ Very similar to how we usually write in this class

Please say why:

Did you like using *Fable Writer*?

- ❍ Yes
- ❍ No

Please say why:

What did you like THE MOST about *Fable Writer*?

What did you like THE LEAST about *Fable Writer*?

What changes would you make to *Fable Writer* to make it better for you and other students?