

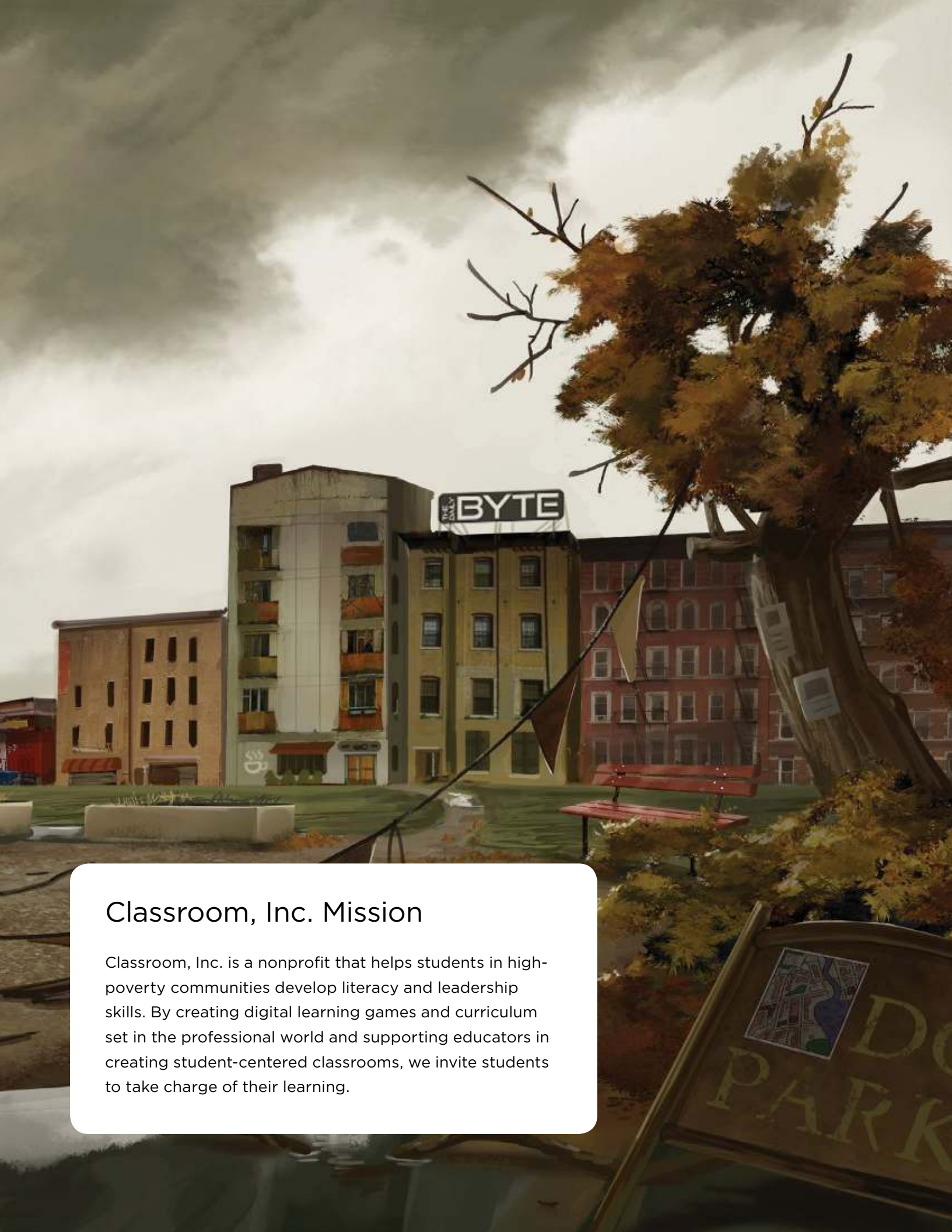
# Changing the Game for Adolescent Literacy and Leadership:

Results from the Learning Game *After the Storm*



Classroom, Inc.

Engaging Students • Supporting Teachers



## Classroom, Inc. Mission

Classroom, Inc. is a nonprofit that helps students in high-poverty communities develop literacy and leadership skills. By creating digital learning games and curriculum set in the professional world and supporting educators in creating student-centered classrooms, we invite students to take charge of their learning.



# Contents

Summary of Key Findings . . . . .	5
<i>After the Storm</i> : Game Structure and Program Implementation . . . . .	6
<i>After the Storm</i> : Learning Goals . . . . .	7
<i>After the Storm</i> : Design Principles . . . . .	8
Evaluation of <i>After the Storm</i> . . . . .	14
Key Finding: Students Improve Reading and Writing . . . . .	16
Key Finding: <i>After the Storm</i> Improves 21st Century Skills . . . . .	22
Key Finding: <i>After the Storm</i> Improves Educators' Instructional Efficacy . . . . .	25
Appendix . . . . .	26
References . . . . .	28



# A New Approach to Literacy for Middle School and Transition to High School

97% of U.S. children between the ages of 12 and 17 play games. As gamers, they know the basic experience of a game as “pleasantly frustrating” (Gee, 2007), and they know that it takes repeated attempts to succeed and gain mastery.

*After the Storm* makes the most of this experience and helps students become more motivated to read and problem-solve than they would have been in a typical classroom setting. For struggling readers, the game is an avenue to successful reading and writing that just did not exist for them before.

*After the Storm* is the first in the *Read to Lead* series of games designed for students to apply key Common Core State Standards (CCSS) in literacy.

Through the use of an engaging program that inspires students, *After the Storm* aims to:

- Improve students' reading and writing skills,
- Increase students' career awareness and 21st century skills, and
- Impact teachers' instructional efficacy.

This report examines progress towards these goals.



# Key Findings

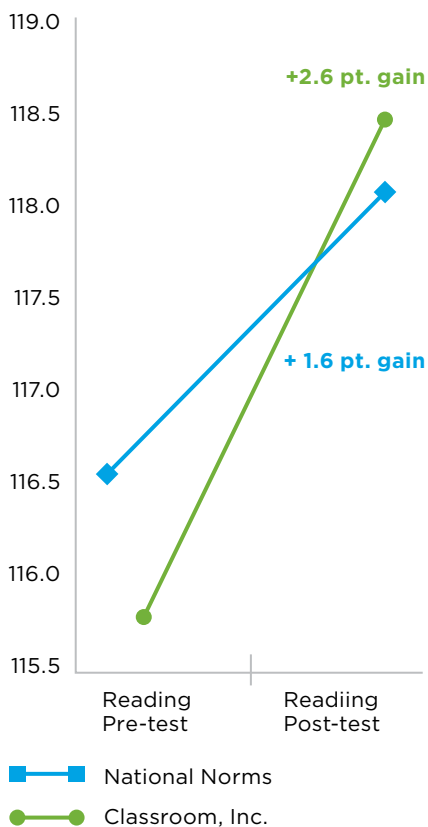


During the 2014-15 school year, Classroom, Inc. partnered with 21 schools to implement *After the Storm*. The game was used by 1,450 students in 68 school-day and after-school classes.

To evaluate the success of the pilot program, Classroom, Inc. conducted a multi-method evaluation to determine progress against the goals of *After the Storm*.

## *After the Storm* Closes the Reading Gap

- Students who used *After the Storm* jumped ahead of their peers and exceeded expected reading growth by 160%.



- 94% of teachers reported that students gained confidence in their reading abilities, and 78% found that students were more motivated to read outside the game.

- 88% of teachers reported improvements in students' performance on other reading and writing assessments, as students were able to transfer skills learned through the game to other ELA tasks.

## Students Improve Decision Making and Critical Problem-Solving Skills

- 84% of students said that the game helped them build persistence when faced with problems.

- 100% of teachers reported improvements in students' problem-solving and decision-making skills.

## Students Connect Their Schoolwork with Career Possibilities

- 89% of teachers reported that the game helped students connect reading, writing and verbal communication skills learned in school to real-world careers.

## Teachers Improve Instructional Strategies for Differentiation and Assessment

- 56% of the teachers using *After the Storm* were more effective in differentiating instruction with their classes when using the game's educator tools and assessments.

# After the Storm: Game Structure and Program Implementation

## Game Structure

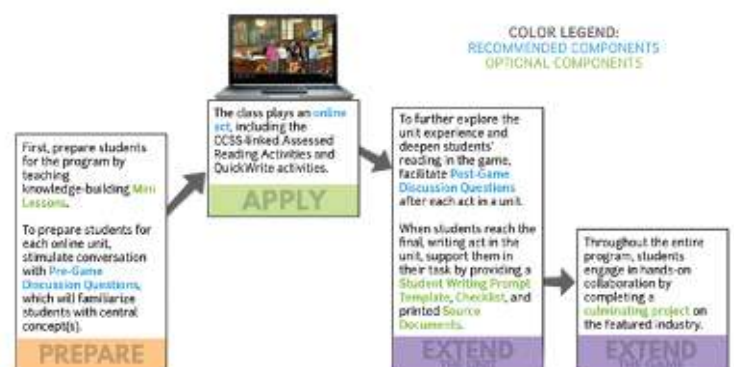
*After the Storm* is comprised of five units in which students take on the role of Editor-in-Chief of the “online magazine,” *The Daily Byte*, in the fictional community of Port Douglas which was recently hit by a major hurricane. Each of the five units of the game represent a full day at work, and span four 45-60



minute class periods—three focusing on reading and one on writing. Each unit is interactive and simulates a real-life work experience. Students perform in-game, work-related activities focusing on Common Core State Standards in English Language Arts—Reading: Informational Text and Writing. While they play the game, students are seamlessly assessed on these standards, and—depending on their performance—their path in the game is differentiated to either provide them with further instructional support or to allow them to move on to more challenging activities.

## Program Implementation

*After the Storm* is a supplemental curriculum that amplifies and reinforces instructional goals. The game is flexible and can be used in a variety of settings, including in ELA classes during the school day, in after-school or extended day programs, or in summer programs. The program combines online game play and an offline curriculum, including a hands-on project, and is predominantly used by middle school students. However, it is also appropriate for and used by high school students who read below grade level.



# After the Storm: Learning Goals

## Focus on Reading During Critical Middle School Years

*After the Storm* is designed for struggling readers. It targets rigorous learning standards, and provides instruction, practice, and support within the game while giving students opportunities to build reading and writing skills. *After the Storm* includes specific game features that engage students, improve motivation and attitudes toward reading, improve reading comprehension, and encourage students to read more both within and outside the game. This is especially critical for students who have struggled with traditional reading tasks in school; *After the Storm* redefines reading success for these students by providing a gateway to reading in a fun, engaging game environment.

## Connecting Academics to the Professional World and Building 21st Century Skills

In their role as Editor-in-Chief for *The Daily Byte*, students repeatedly make consequential decisions and solve authentic work problems. Students must lead a team, manage employees, and make decisions, all while considering the needs and perspectives of others. Each unit of *After the Storm* focuses on a main problem or issue that students address by gathering information, analyzing the situation, and making decisions. As students navigate through a day in the life of a working professional, they experience challenges related to how the storm has affected both their workplace and the community. These problems can only be solved by analyzing evidence in the texts they read, considering multiple points of view, and applying critical thinking and problem-solving skills. By situating literacy tasks in authentic professional contexts, students build both a deeper understanding of the 21st century skills that are required for career success and the importance of the literacy skills to their future careers.





# *After the Storm:* Design Principles

The design of *After the Storm* is based on several grounding principles that research has shown are linked to the goals of the program. Specifically, when students are immersed in rigorous activities that absorb their attention, use formative assessment, and are personalized, they are more likely to improve their reading and 21st century skills. Likewise, teachers' instructional efficacy improves while using a program that holds these principles.



*After the Storm* was built based on 4 key design principles for effective learning games:

1. Immersive Experience
2. Rigorous Content
3. Embedded Assessments
4. Personalized Learning





# After the Storm: Design Principles

## 1. Immersive Experience

The game uses young people’s fascination with games, exciting narratives, mystery, suspense, and problem-solving to draw students in and maintain their engagement (Rowe et al, 2007). The compelling storylines and problems require students to engage in “meaningful play,” which research has shown enhances student learning (Gee, 2007; Salen & Zimmerman, 2005), while also providing experiences that are “pleasantly frustrating” in order to hook and challenge students (Gee, 2007).



## 2. Rigorous Content

Students’ college and career readiness improves when they are given opportunities to read rigorous texts. Research has shown that less than 15% of 6th-12th grade students read one or more books in their target range (Renaissance Learning, 2015). *After the Storm* requires students to read nonfiction text to play the game—the equivalent of 2 middle school level books—so that by simply playing the game they read rigorous text and practice their reading skills. *After the Storm* is a powerful resource to disrupt and improve traditional student pathways to college and career readiness by providing students with grade-level, rigorous nonfiction text situated in a career-oriented game.



# After the Storm: Design Principles

## 3. Embedded Assessments

*After the Storm's* student assessments are ongoing and embedded into the game content. There are three in-game reading assessments and one online writing assignment per unit, as well as additional opportunities to write both within the game and in the off-game projects and assignments. All students complete one primary embedded assessment, designed around a single CCSS, for each class period of game play.

While the game provides students with an engaging way to practice and reinforce core literacy skills, it simultaneously gives teachers actionable data to inform their teaching practices and lesson content choices. Specifically, the game's embedded assessments are formative and are used by teachers to monitor, measure, and support student progress and learning during instruction. *After the Storm* situates formative assessments into the narrative of each game episode so that the tasks—whether they are practicing close reading when editing a “coworker’s flyer” or thinking critically about which staff member to send on a mission—are authentic and compelling to students. Well-designed, authentic assessments seamlessly integrated into game mechanics are a critical strength of employing games to deliver educational content.

**“My students were so motivated to play this program. They didn’t view it as work and constantly asked to play it.”**

—Mrs. Dunne,  
8th grade teacher, Chicago, IL

**“This game was much more interactive [than my other classes]. It kept my attention for a long period of time without making me bored. I could keep playing and learning; and reading was much more fun and entertaining.”**

—Bryan, 7th grade,  
Davies County, KY



# After the Storm: Design Principles

The screenshot shows a game interface with a character icon on the left and a feedback panel on the right. The central area displays a line graph titled "BYTE" showing the number of people (Volunteers and Guests Served) from August to January. A feedback box on the left contains a critique of a statement. The feedback panel on the right lists four options, with the second one selected and a green checkmark below it.

**Feedback Panel (Left):**

No, that statement isn't a very persuasive conclusion. Kitchen Soup needs volunteers right away, so look for a statement that says that.

**Graph Data (Center):**

Month	Volunteers	Guests Served
August	10	50
September	10	50
31 Sep	10	50
October	40	100
November	20	90
December	10	100
January	10	100

**Feedback Panel (Right):**

Choose the best option.

- If you don't like working here, there are lots of other places in Port Douglas that need volunteers.
- The time to join Kitchen Soup is now, when we need you the most! ✓
- Kitchen Soup's most popular meal is meatloaf and mashed potatoes. Mmmmmmm!
- People who volunteer often do better in the work they do to earn a living.

Example of an embedded assessment in the game. In this example, the student receives feedback from Super Ed as they complete game assessments.

This screenshot is similar to the first one but includes a rationale for the correct choice in the feedback panel. The graph data is also slightly different, with the peak in October reaching 120 guests served.

**Feedback Panel (Left):**

Absolutely! That's a strong concluding statement because it makes the situation sound urgent -- which it is. Kitchen Soup needs need more volunteers right away, and this concluding statement gets that message across.

**Graph Data (Center):**

Month	Volunteers	Guests Served
August	10	50
September	10	50
31 Sep	10	50
October	40	120
November	20	100
December	10	120
January	10	120

**Feedback Panel (Right):**

Choose the best option.

- If you don't like working here, there are lots of other places in Port Douglas that need volunteers.
- The time to join Kitchen Soup is now, when we need you the most! ✓
- Kitchen Soup's most popular meal is meatloaf and mashed potatoes. Mmmmmmm!
- People who volunteer often do better in the work they do to earn a living.

Super Ed gives students the rationale behind correct choices to reinforce learning.

# After the Storm: Design Principles

## 4. Personalized Learning

The game was designed to provide supportive tasks to students who are struggling with reading and to give more challenging tasks to students who successfully complete the game's assessments [See Diagram on page 13]. This instructional approach personalizes the learning pathways for students, seamlessly directing them to an appropriate activity to complete within each unit. Support activities include less complex text and fewer assessment items and are accompanied by instructional tips and feedback from "Super Ed," the in-game instructional coach. Students who still perform poorly are tracked to a second support activity that relies on visual cues and/or a different approach to help them to get at meaning.

All students who receive support, regardless of performance, return to the primary reading assessment and retake the assessment items they originally got wrong. Students who are successful on the game's primary activities are routed to multi-part challenge activities where they complete tasks that are designed at a higher level. This entire loop is designed to be completed during each period of game play. Wraparound offline lessons are also provided to support student learning within the game. As students complete tasks, the game collects and scores the activities and those scores are instantly available to teachers in the class dashboard.

**“The [thing that is] most different [about the game] is the fact that we are using technology to actually do our work, which catches my attention better than an actual pen and paper.”**

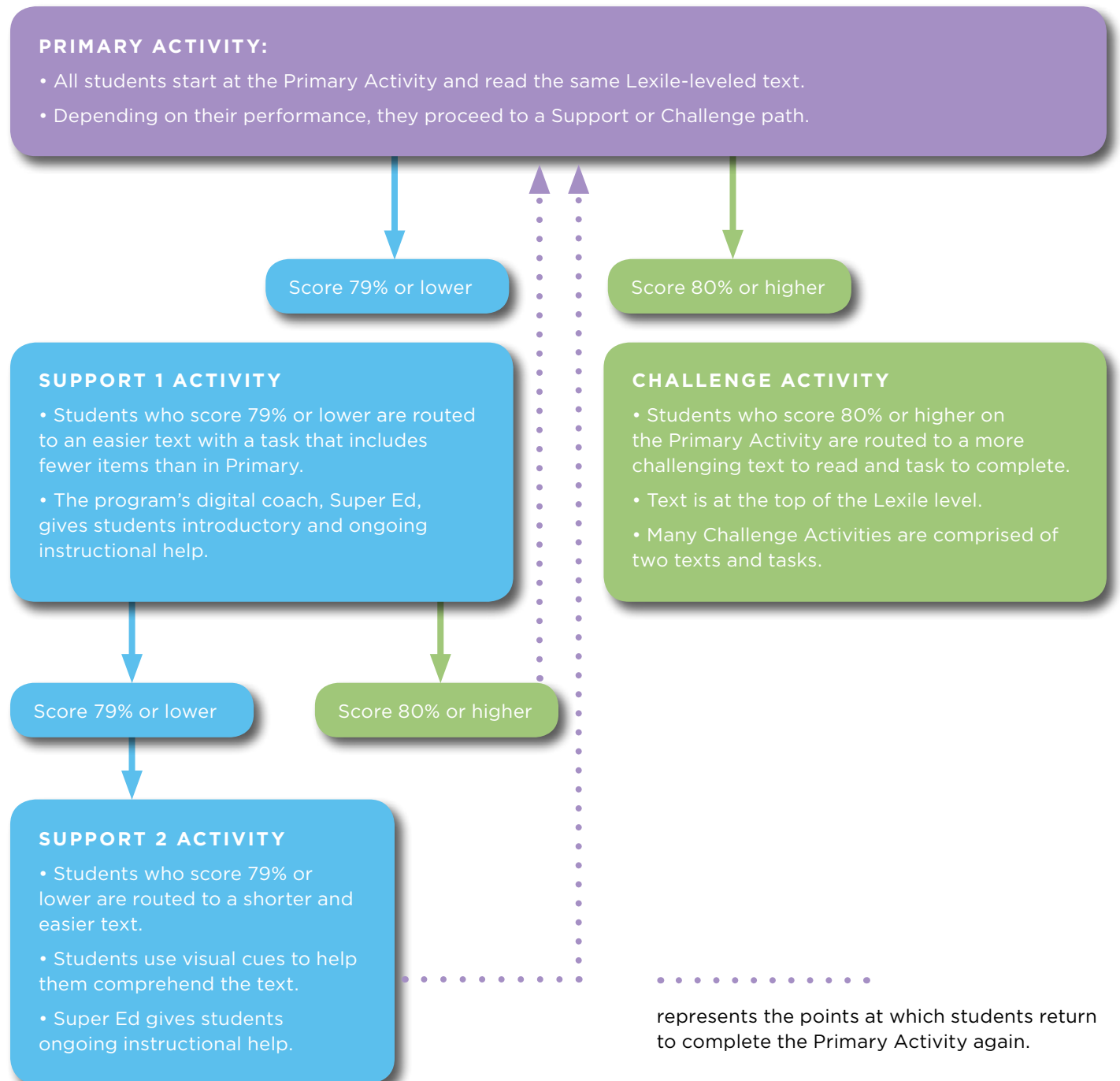
—Hazel, 8th grade, Queens, NY





# After the Storm: Design Principles

## After the Storm's Instructional Design is Personalized



# Evaluation of *After the Storm*

To better understand the impact that *After the Storm* had on students and teachers, a multi-method evaluation study was conducted.\* The evaluation was designed to determine how Classroom, Inc. met the following goals of the program:

## 1. Improving students' reading and writing skills

Reading skills were measured by comparing pre- and post-scores on the **Reading-Level Indicator**, a standardized assessment that assesses vocabulary and sentence comprehension. Additionally, reading and writing skills were assessed with student and teacher post-program surveys. Student attitudes toward reading are important not just in and of themselves, but research shows that attitudes and engagement are linked to enhanced academic performance (Blackwell, Trzesniewski & Dweck, 2007; Fredricks, Blumenfeld, & Paris, 2004). In this study, motivation for reading was measured using student post-program surveys.

## 2. Increasing students' career awareness and 21st century skills

Students will need to master a set of "21st Century Skills" to succeed in careers of the future (Partnership for 21st Century Learning, 2011) and at the same time, they rarely have opportunities to learn and make connections between their school work and careers (High Schools and Career Readiness: Strengthening the Pipeline to the Middle Class, April 2013). *After the Storm* was designed to make these connections explicit and to improve awareness of careers.

Career awareness, problem-solving skills, and task persistence were measured using student and teacher post-program surveys.

## 3. Improving teachers' instructional efficacy

Experts have called for novel instructional approaches that foster deeper student engagement and learning practices beyond the traditional rote, fact-based style of instruction (Gulamhussein, 2013). To assess how *After the Storm* impacts instruction, teachers' instructional efficacy was measured on teacher post-program surveys.

\*More information about study methodology is provided in the Appendix.

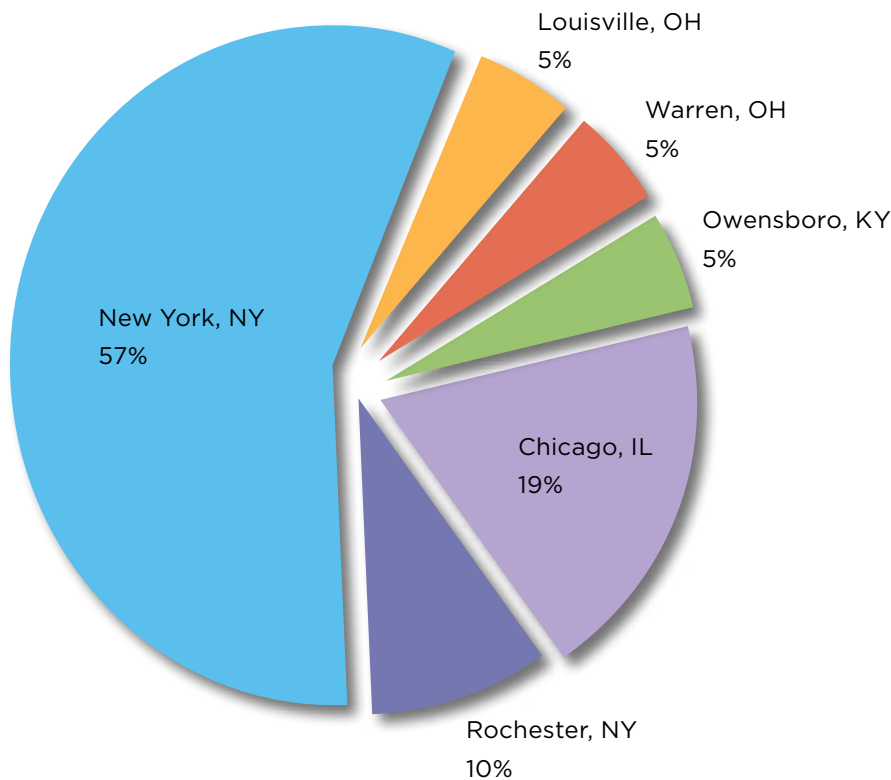
# Profile of Participating Schools and Students

In the 2014-15 school year, Classroom, Inc. supported 1,450 students using *After the Storm* across 68 classes in 21 schools. Seventeen of the schools were Title I public schools and 4 were Catholic schools with significant enrollment by low-income students.

Nearly all students (90%) were in 6th, 7th, or 8th grade and 73% identified themselves as a race other than White. Most classes used *After the Storm* during the school day (55), and 13 used it in after-school programs or during extended learning time.

Three-quarters of the schools that used *After the Storm* were based in New York, NY and Chicago, IL.

## Geographic Locations of Schools Using *After the Storm* (N=21):



# Key Finding:

## Students Improve Reading and Writing

Students who used *After the Storm* jumped ahead of their peers, making statistically significant reading gains.

Students in Classroom, Inc. classes completed the *Reading-Level Indicator* assessment before and after using *After the Storm*. Students' scores were compared with the test publisher's national norms to determine whether they evidenced greater than expected growth in reading.

An independent-samples t-test was conducted to compare the change in *Reading-Level Indicator* scaled scores of Classroom, Inc. students to that of the national norm sample. There was a significant difference between the change score for Classroom, Inc. students ( $M=2.60$ ,  $SD=7.83$ ) and the national norm sample ( $M=1.60$ ,  $SD=0.12$ );  $t(998)=2.839$ ,  $p<.01$ , where Classroom, Inc. students made significantly greater gains in reading.

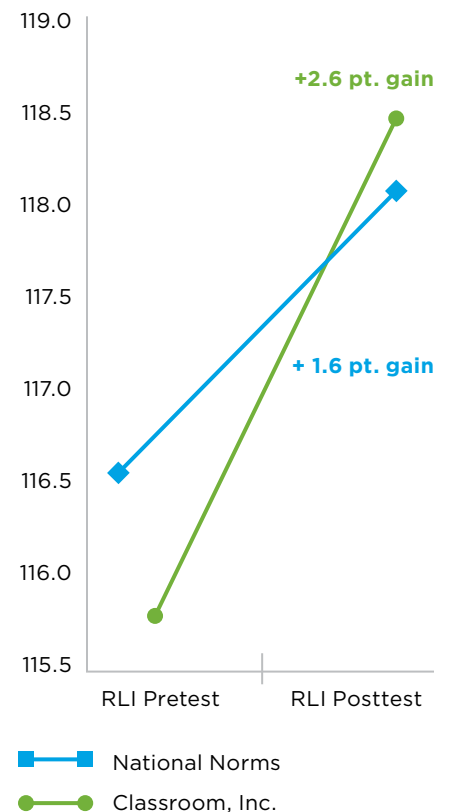
These results suggest that *After the Storm* more than closed the achievement gap in reading for our low-income students compared with average students in the U.S. Students who used *After the Storm* significantly exceeded expected reading growth by 160%, improving foundational reading skills of vocabulary and sentence comprehension.

- Results show that Classroom, Inc. students entered the program reading at a level lower than national norms.
- Classroom, Inc. students were reading at a level higher than national norms upon completion of the program.

**“The most important thing I learned in *After the Storm* is that learning can be fun, and that I love to write and read.”**

**—Jose, 6th Grade, Bronx, NY**

### Closing the Gap: Classroom, Inc. Students Gained More than Expected Based on National Norms\*



\*Data from a single school were excluded from displayed analyses on reading performance. This school was not part of Classroom, Inc.'s target population and used the game as part of study conducted by SRI on behalf of the Gates Foundation. Note that students in this school made significant reading gains consistent with the presented findings, but their incoming test level was substantially higher than the target cohort of schools.



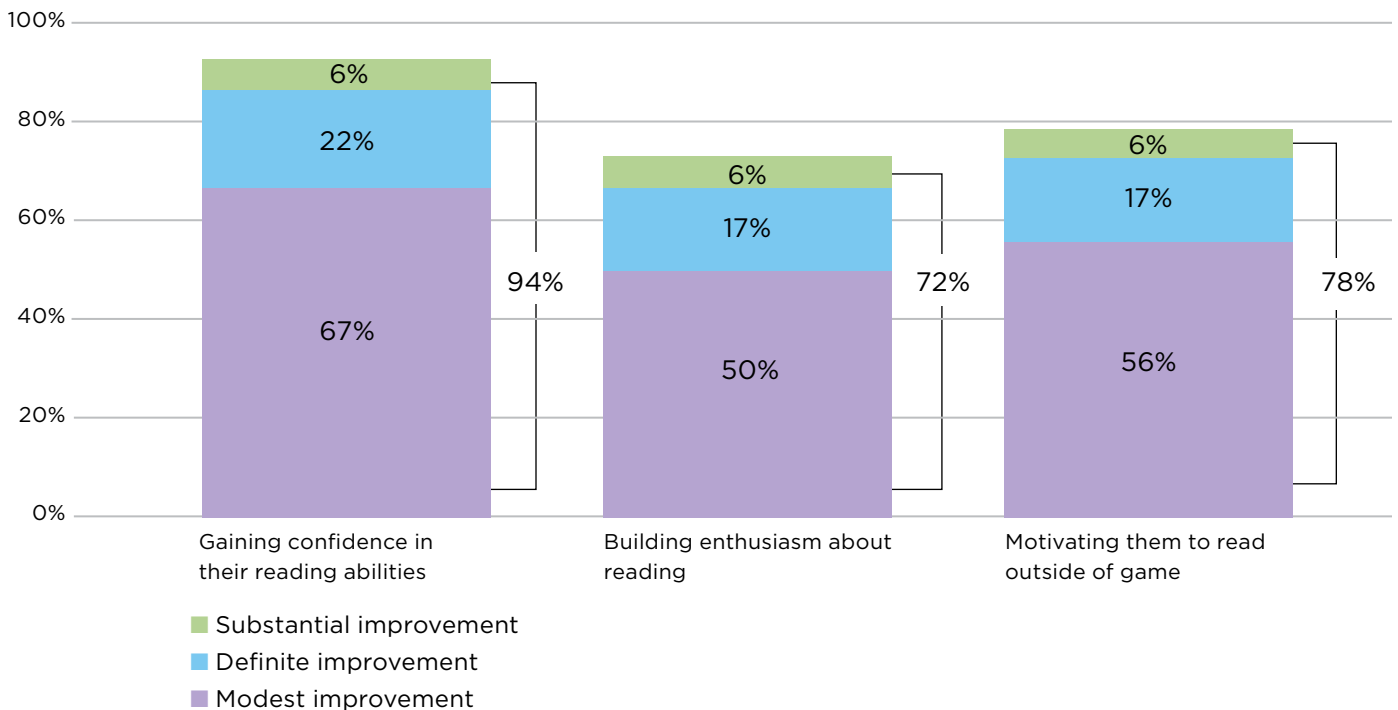
# The game experience increases students' interest in reading.

Students' attitudes toward reading tend to worsen over their school career, with the decline beginning as early as first grade and accelerating for the most struggling readers (McKenna, Kear, & Ellsworth, 1995). *After the Storm* helped students see the importance of reading well to succeed in school (85%), and built students' confidence, enthusiasm, and motivation to read outside of the game. Given that students who believe that they can read well do so more frequently (Baker & Wigfield, 1999), *After the Storm* is providing a pathway to success in reading for struggling students. *After the Storm* boosted students' attitudes at a critical point in time, as attitudes held by students at the beginning of middle school have a strong influence on their future achievement (Blackwell, Trzesniewski, & Dweck, 2007).

“The most important thing about the game compared to other reading and writing exercises is that from one activity you do [in *After the Storm*], you can learn multiple skills or enrich those skills.”

— Damian, 8th Grade, Queens, NY

## Teacher-Reported Student Improvements



## After the Storm's differentiated learning pathways were effective in supporting learning.

*After the Storm* is a “pleasantly frustrating” game (Gee, 2007) that draws students in with the game narrative, real-world scenario, and story lines while concurrently challenging them at their learning level, and boosting their confidence and engagement. This balance of difficulty, engagement, and autonomy makes game-based learning powerful and effective (Csikszentmihalyi, 2000; Juul, 2013). The game couples embedded assessment with adaptive interventions to keep students sufficiently challenged and engaged (Shute et al, 2009), using adaptive features and educator tools to personalize instruction for students at varying skill levels.

In *After the Storm*, when students struggle on their first attempt of the primary assessment they receive support activities to address gaps in learning. Then, they return to the primary assessment for a second try. In each chart the data in the blue bars show their scores on the primary activity on the first time that students encountered it and the green bars show their second attempt after receiving support on three Common Core Standards. For students who struggled with the primary assessments (averages were 42%, 45%, and 49%), the feedback and assistance in the game (from *Super Ed*) led to increases in their activity score on the second try (to 75%, 74%, and 60% respectively).

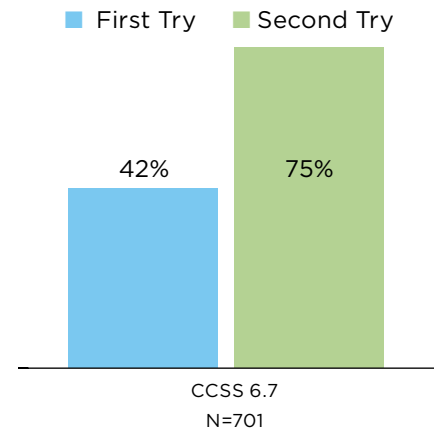
This is a critical finding, as it shows that our differentiated learning pathways correctly identified and supported struggling students, and directly improved their performance on assessments through our intervention.

**“The thing [that is most different] about the game from my reading and writing classes was that when I am writing something [in the game], there is Super Ed giving me advice how to write it. In my [regular] classes, it is harder since the advice is not always understandable.”**

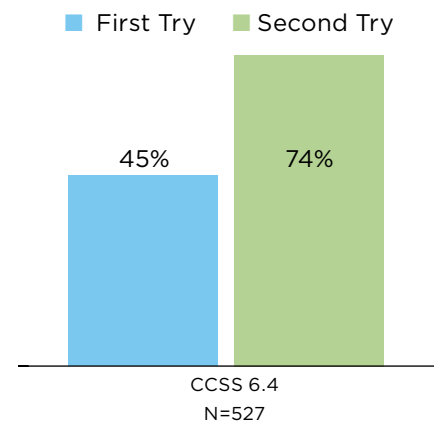
**—Alison, 7th grade, Chicago, IL**

### Average Assessment Scores on CCSS RI 6.7:

#### Integrating Information

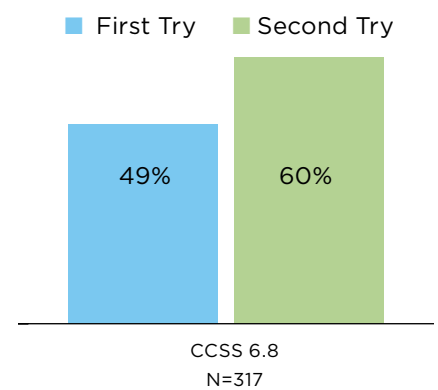


### Average Assessment Scores on CCSS RI 6.4: Vocabulary



### Average Assessment Scores on CCSS RI 6.8:

#### Evaluating Text Claims



**Note:** Scores included only from students who followed the support pathway, as students who completed challenge activities made only a single attempt at the primary assessment.

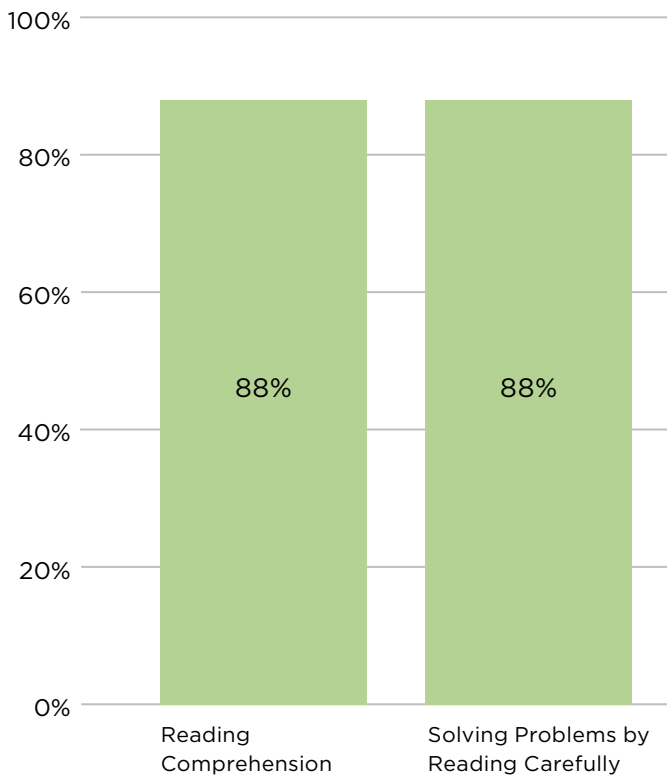
# Students who played *After the Storm* improved in reading comprehension.

It is critical to students' future success to read and comprehend informational texts as well as they do narrative texts (Goodwin & Miller, 2012/2013). *After the Storm* is made up of informational, expository texts that range from documents for information dissemination to persuasive texts that argue for specific ideas. By reading through the game, 94% of students reported that it helped them to build critical reading behaviors like finding the main idea in an article, and 90% learned how to find the meaning of unfamiliar words. Expository text comprehension is important not only for learning English Language Arts, but for learning in other content areas as well (Matthiessen, 2014). Nine out of ten teachers reported that students improved in reading comprehension and solving problems through reading as a result of playing *After the Storm*.

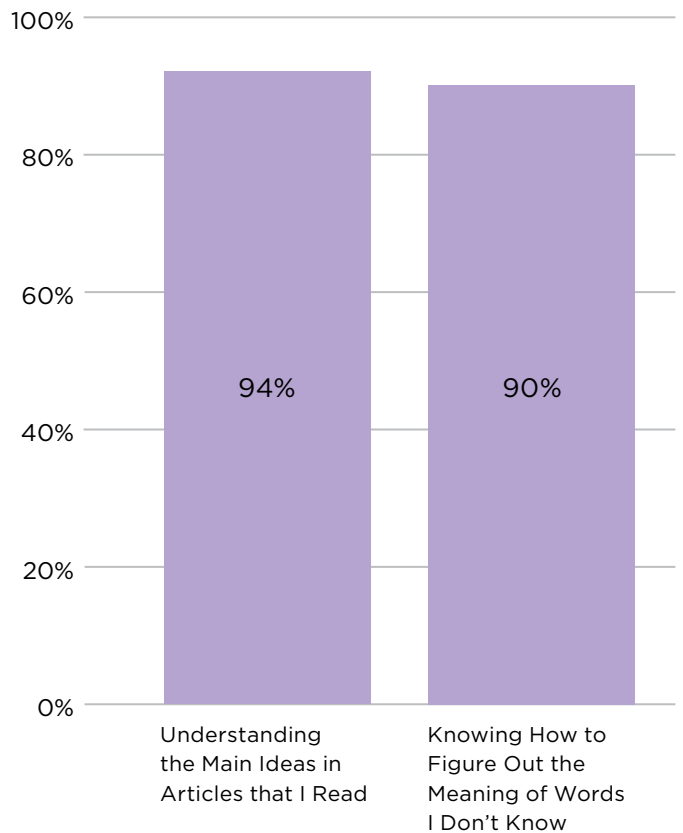
“*[After the Storm]* helped me understand harder text, and it gave me a feel of what a professional job might be like.”

—Nadia, 6th grade, Bronx, NY

**Teacher-Reported Improvement in Reading**



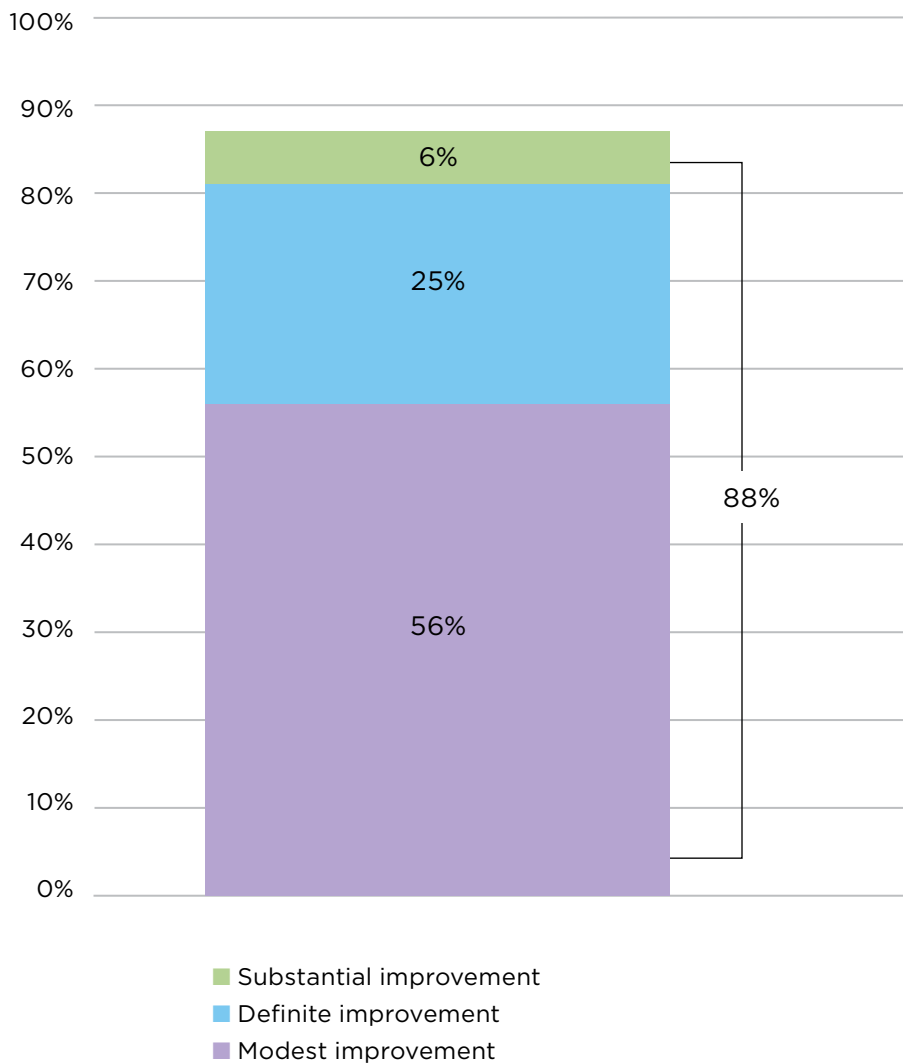
**Student-Reported Learning in Reading Skills**



# Students transfer skills gained in *After the Storm* to other reading tasks and assessments.

After playing *After the Storm*, students also improved in other non-game reading and ELA assessments.

## To what extent did *After the Storm* help students improve their performance on other reading or ELA Assessments?



# 88%

of teachers reported that students showed modest to substantial improvements on other reading or ELA assessments after using *After the Storm*.

“[My favorite thing about *After the Storm* was] the real world connection to journalism. I found the reading documents to be well aligned with standards. This program was a great supplement to our curriculum. I like how the program required students to rework activities if they were not successful the first time. The writing prompts were in direct correlation to our writing standards.”

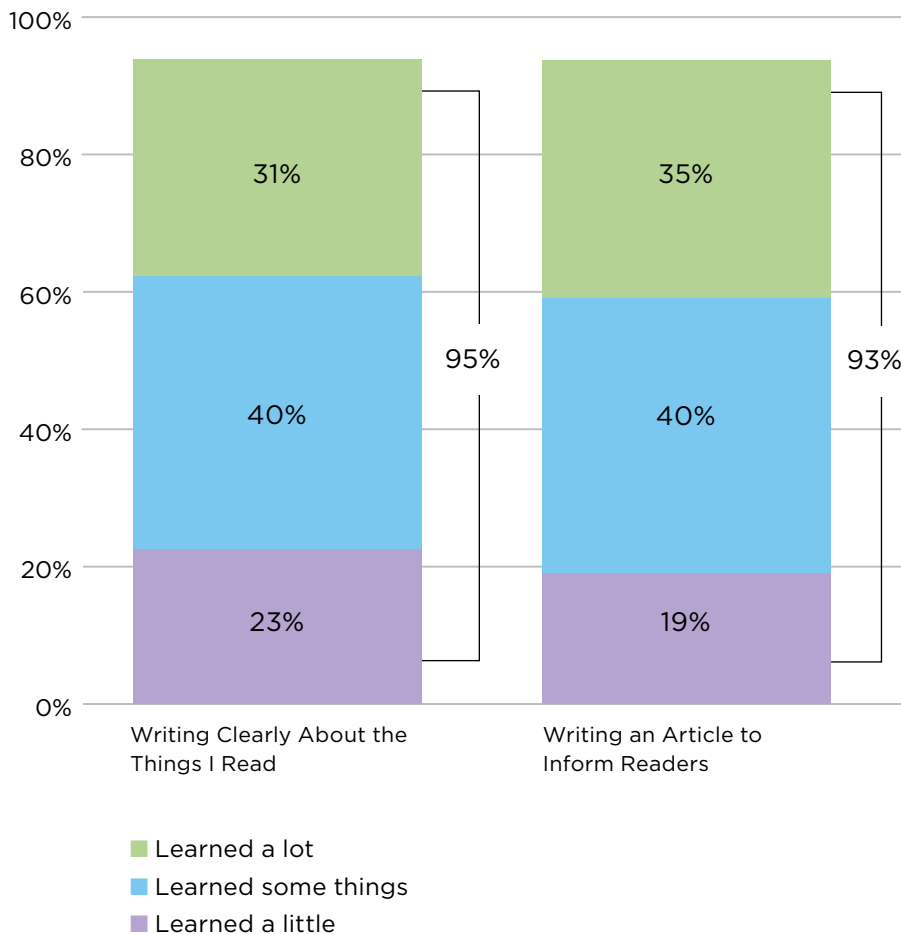
— Mrs. Jones,  
7th grade teacher,  
Daviness County, KY



## After the Storm improved students' writing skills.

After the Storm provides many opportunities for students to practice evidence-based writing as well as more informal reflective pieces of writing. As a result, 94% of teachers reported that their students improved in informative writing. Nearly all students said that the game taught them to write more clearly.

### Student-Reported Learning About Writing



# 88%

of teachers reported modest to substantial improvements in students writing about what they read.

# 94%

of teachers reported modest to substantial improvements in informative writing.

“What was most different about the game from other reading or writing classes is the fact that I get to base my answers on my own personal view whereas [in other classes, teachers] may ask you to answer the question in a certain way. After the Storm let me answer the question [from] my own perspective.”

—Nicholas, 8th grade,  
Queens, NY

# Key Finding:

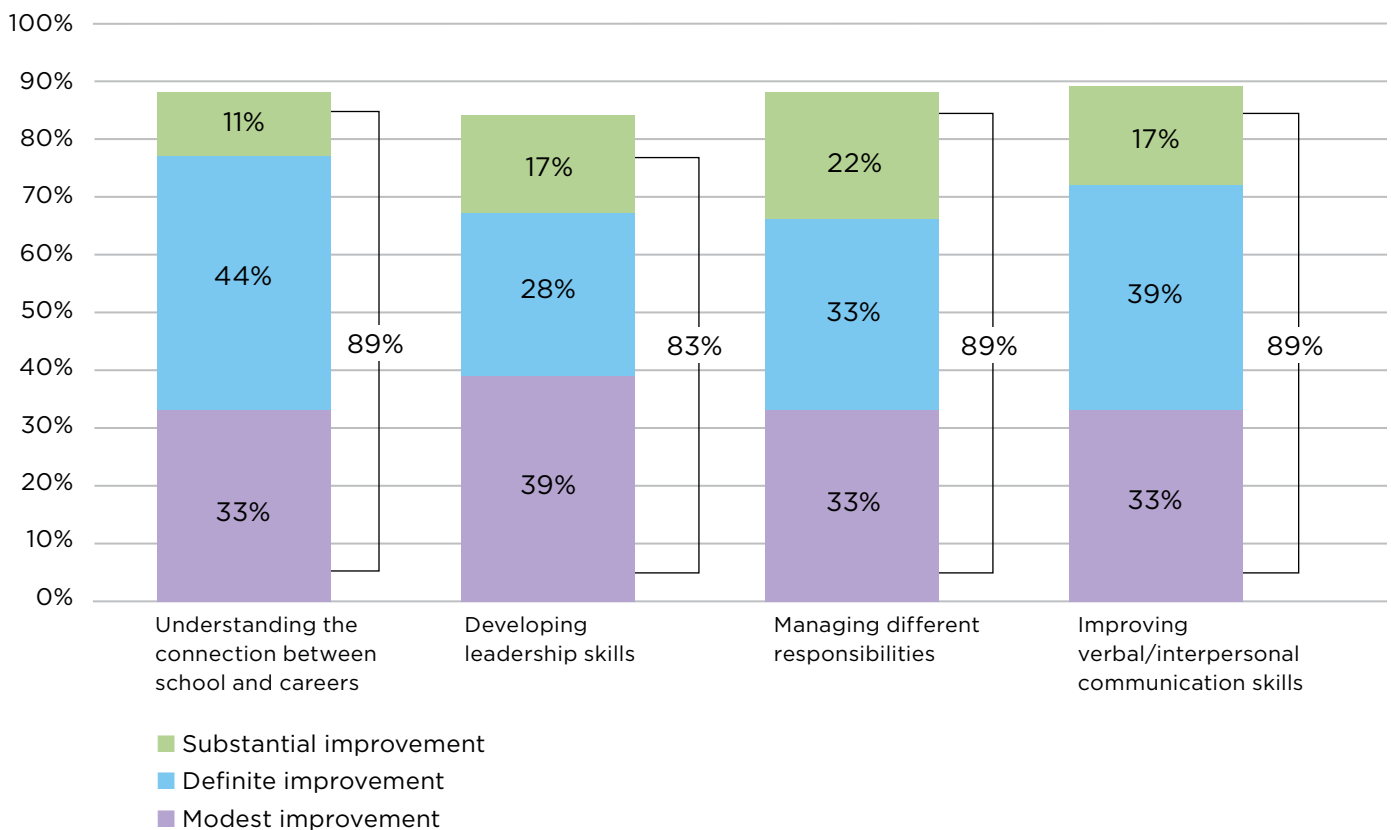
## *After the Storm* Improves 21st Century skills

By the time they graduate high school, many students still have never had opportunities to learn how their school work connects with careers in the “real world” (High Schools and Career Readiness: Strengthening the Pipeline to the Middle Class, 2013). *After the Storm* solves this problem; students and teachers reported that young people learned about careers and leadership when playing the game. Specifically, students and teachers reported that the game helped students to make connections between school and careers while exposing them to real-world situations that they would not otherwise have had a chance to experience.

# 96%

of students reported learning about how to work in an office as a result of playing *After the Storm*.

### Teacher-Reported Improvement in 21st Century Skills

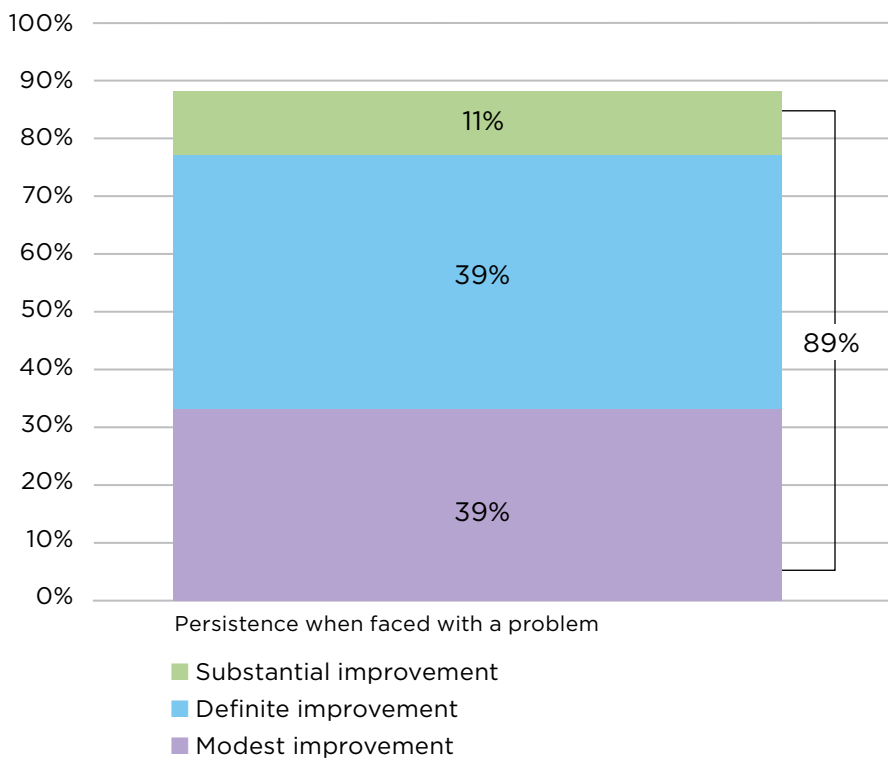


Persistence is a critical 21st century skill that allows a young person to stick with a challenge, even when facing difficulty. It has been shown in research that persistence is linked to academic (Boe, May, & Boruch, 2002) and longer-term career outcomes (Andersson & Bergman, 2011). There is also evidence that students who experience some level of struggle when solving problems actually outperform those who receive assistance with difficult tasks early on (Kapur, Bielaczyc, 2012). *After the Storm* leverages this learning by challenging students with activities and providing them with chances to elaborate on their work in writing exercises. As a result, teachers and students reported that the game helped to build persistence when faced with problems.

# 84%

of students see how important it is to keep working hard until a problem is solved as a result of playing *After the Storm*.

### Teacher-Reported Improvement in Students' Persistence



“The most important thing that I learned was [that] you should always keep trying.”

—Kyle, 6th grade, Bronx, NY

“[*After the Storm*] taught me to] never give up on big things that you are working on.”

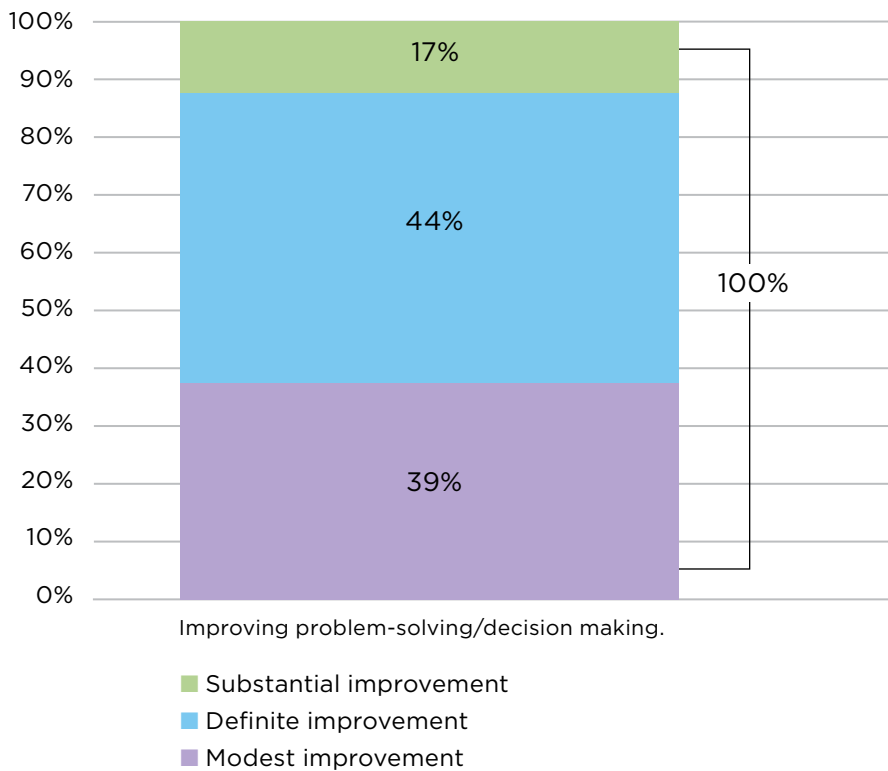
—Christine, 8th grade, Queens, NY

Problem-solving has been cited as a foundational 21st century skill (Partnership for 21st Century Skills, 2004) because the ability to effectively solve problems prepares young people for the complex decisions they will need to make in life and the modern work environments they will enter as they grow older. *After the Storm* helps students to make good decisions. Every teacher reported that their students made modest to substantial improvements in problem-solving skills.

# 80%

of students reported learning how to weigh different options to solve problems when playing *After the Storm*.

### Teacher-Reported Improvement in Problem Solving



“The most important thing that I learned from *After the Storm* was to never give up on an assignment, to get everyone’s suggestion[s] on everything, and to work together to get things done.”

—Rebecca, 7th grade,  
Daviness County, KY

“I learned what it’s like to be editor-in-chief of a news website. I have gotten to experience one of the many jobs out there in the world to see if I like to use my literary skills in that way.”

—Nicole, 6th grade,  
Bronx, NY

# Key Finding:

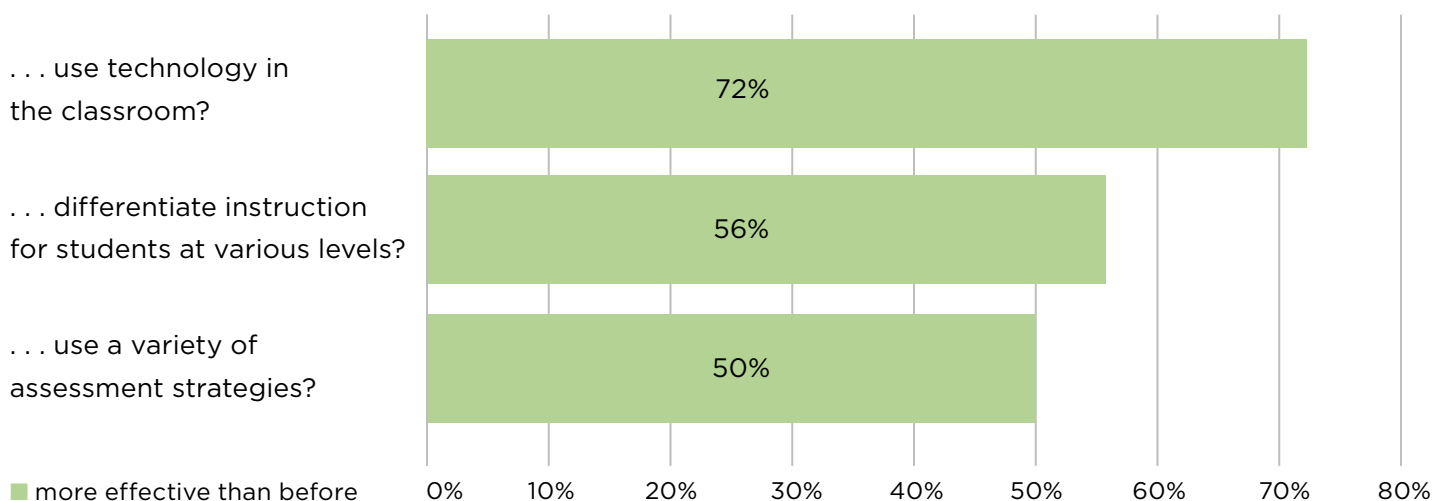
## *After the Storm* Improves Educators' Instructional Efficacy

*After the Storm* leverages game-based technology, and empowers teachers to innovate their instructional approach with its digital tools. *After the Storm* sets students upon personalized learning paths, giving them freedom to be more self-reliant and motivated than in a traditional classroom environment. This allows teachers opportunities to assist those students who need more structure or help with a given lesson. Additionally, teachers are provided with a dashboard that displays ongoing, real-time, formative views of each student's performance and progress in the game. These detailed data drive teachers to differentiate their instruction by using the formative assessment results from the game. Our results show that many teachers reported being more effective in using technology, differentiating instruction, and using assessment strategies after using *After the Storm*.

**“In *After the Storm*, I got to manage my own work and actually be the boss of all my tasks and responsibilities.”**

**—Katherine, 8th grade,  
Queens, NY**

### Has using *After the Storm* changed how you . . .





# Appendix

## Methodology

### Student and Teacher Participants

Twenty-one schools that used *After the Storm* during the 2014-15 school year participated in this study. In total, there were 1,450 students and 36 educators that used *After the Storm*.

**Note:** Names have been changed throughout the report to protect student and teacher confidentiality.

### Demographics of the Student Sample

Gender	N	%
Male	742	54%
Female	622	46%
Missing	86	

Race/Ethnicity*	N	%
American Indian/Alaskan Native	10	2%
Asian	15	3%
Black	117	21%
Latino	124	22%
White	154	27%
Native Hawaiian/ Other Pacific Islander	3	1%
Other	55	10%
Mixed	92	16%
Missing	880	

Age	N	%
7-10	18	2%
11-14	997	92%
15-18	73	7%
Missing	362	

Grade	N	%
6th grade	404	28%
7th grade	545	38%
8th grade	330	23%
9th grade	83	6%
10th grade	29	2%
11th grade	15	1%
12th grade	9	1%
Missing	35	

\*Race data were self-reported on student surveys.

### Description of Teacher/Educator Sample

Educator, Self-Reported Role	N	%
Full-Time English Teacher	18	56%
Full-Time Teacher (Subject other than English)	9	28%
Assistant Teacher	1	3%
After-School Group Leader	7	22%
Missing	1	

Years of Experience as an Educator, Self-Reported	N	%
1-2 years	1	6%
3-5 years	5	28%
6-10 years	1	6%
11-20 years	8	44%
20+ years	3	17%
missing	15	

## Instruments

### Reading Level Indicator (RLI)

To assess student reading performance, teachers administered a standardized reading assessment, the *Reading-Level Indicator* (RLI) (Williams, 2000a), before and after students used the program. The RLI is a 40-item measure of vocabulary and sentence comprehension. It is a norm-referenced test developed by American Guidance Service, Inc. that yields data appropriate for assessing program outcomes. The test is group administered. There are two distinct forms of the measure—Form A was used for the pretest and Form B for the posttest. Although the test is untimed, we advised teachers to allow up to 25 minutes to administer it. Raw score, scale score and Instructional Reading Level (for grades 2 through 12) tables are provided by the test publisher. The test is only available in hard copy, paper-and-pencil format.

**Analysis of Pre/Posttest Data.** To compare students' performance on the pre- and post-tests, students' raw test scores were converted into scale scores using W-ability scale score conversion figures provided in the publisher's test manual (Williams, 2000b). Each student's pre- and post-scores were compared with their "expected" scores. Expected pre-scores were drawn from the publisher's test manuals by taking the instructional reading level score for each student's current grade level. Expected post-scores were drawn from the instructional reading level score for the grade above the student's current grade level. These expected scores were compiled into the scores for the norm group from which they were originally based. Using an independent samples t-test, mean change scores (difference between post- and pre-scores) were compared between students' actual scores and expected scores for those students.

### End-of-Program Surveys

Surveys were constructed from empirically validated assessments of reading self-efficacy, motivation for reading, and teacher instructional self-efficacy. All surveys were administered after program completion.

**Student Survey.** The student post-survey assessed students' self-judgments of reading and writing skills, efficacy of the program for learning literacy and 21st century skills, enjoyment and engagement in the game, relevancy of the game and literacy to future careers and workplace skills, and motivation and enjoyment of literacy as a result of ATS.

**Teacher/Educator Survey.** The educator survey assessed teachers' judgments of student learning in literacy and 21st century skills, program efficacy and ease of use, and teachers' instructional efficacy. Information on teacher experience and teacher familiarity with educational technology and blended learning programs were also included.

## Procedure

Students completed pre-test Reading-Level Indicator assessments during the week prior or during the first week of using *After the Storm*. The start date of their usage varied based on their implementation plans and existing school schedules. Post-test RLI assessments and end-of-program surveys were collected after classes finished using *After the Storm*. Pre-test data were collected between 9/9/2014 and 3/11/2015 and end-of-program data were collected between 4/22/2015 and 6/25/2015.

- 1182 students completed a pre-test RLI and 711 completed a post-test RLI, with 629 students completing both pre and post-tests.
- 570 (39.3%) students and 18 (58.1%) teachers/educators completed end-of-program surveys.

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245 Fifth Avenue, 20th Floor

New York, NY 10016

P 212 545 8400

F 212 481 7178

[info@classroominc.org](mailto:info@classroominc.org) | [www.classroominc.org](http://www.classroominc.org)