iSTART-2

A Reading Comprehension and Strategy Instruction Tutor

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Introduction

This chapter provides an overview of the Interactive Strategy Tutor for Active Reading and Thinking-2 (iSTART-2). iSTART-2 is a game-based tutoring system designed to improve students' reading comprehension skills. It does so by providing them with instruction on how to self-explain using comprehension strategies. Instruction is provided through lesson videos and practice within a game-based environment. iSTART-2 has demonstrated effectiveness for students in middle school, high school, and college (Jackson & McNamara, 2013; McNamara, Levinstein, & Boonthum, 2004; McNamara, O'Reilly, Best, & Ozuru, 2006; McNamara, O'Reilly, Rowe, Boonthum, & Levinstein, 2007; Snow, Allen, Jacovina, & McNamara, 2015).

In this chapter, we first discuss why reading comprehension is a critical skill and how the iSTART-2 system addresses the development of this skill through the instruction of five comprehension strategies. Second, we provide an overview of the iSTART-2 system and its features. Third, we discuss the need for this reading comprehension technology in the classroom and provide a general overview of how iSTART-2 addresses those needs as well as the Common Core State Standards. Fourth, we describe previous findings from research using the various iterations of the iSTART-2 program. Finally, we describe how iSTART-2 can be accessed by teachers and used within classroom environments.

Reading Comprehension

Over the last few decades, researchers and educators have worked together to identify ways to improve the development of literacy skills for students in grades

K-12. However, many students still struggle to read at a basic level. In fact, in a recent study it was shown that 25 percent or more of students in the 8th and 12th grades perform below a basic level of reading comprehension (US Department of Education (DOE), 2011). One reason for these comprehension difficulties may be that many students lack the necessary skills and knowledge needed to gain a deep understanding of the content embedded within texts (e.g., O'Reilly & McNamara, 2007).

The iSTART-2 program provides students with instruction on comprehension strategies that help them to overcome gaps in their domain knowledge and achieve deep level comprehension of the material within the text (McNamara, 2004, 2007, 2009, in press). This approach to enhancing reading comprehension skills is theoretically inspired by the Construction-Integration model of comprehension (CI model) (Kintsch, 1998). According to the CI model, readers construct multiple levels of understanding of text and discourse. These levels include a surface level understanding (e.g., understanding individual words and sentences), a textbase understanding (e.g., understanding the meaning of what is explicitly stated), and a situation model understanding (e.g., using prior knowledge to elaborate on text information). Combined, these three levels comprise the reader's mental representation of the text.

Students construct a better understanding of the information found in text when they form a coherent situation model. To do so, they must generate *inferences* that serve as bridges between the information in the text and background knowledge (McNamara & Magliano, 2009). A good deal of research has shown that developing a coherent textbase understanding (i.e., understanding the words in the text) is a first and necessary step toward comprehension. But generating inferences while reading, linking the words in the text to background knowledge, is key to deep comprehension (McNamara & Magliano, 2009).

iSTART-2 provides students with explicit strategy instruction on how to form a coherent textbase and how to generate successful inferences (McNamara, 2004; O'Reilly, Taylor, & McNamara, 2006). The iSTART-2 program aims to foster deeper understanding of information found in text by providing students with strategy training to improve their ability to self-explain text. Self-explanation is the process of explaining information to oneself in their own words using their knowledge of the world and the domain targeted by the text (Chi, de Leeuw, Chiu, & LaVancher, 1994; McNamara, 2004; VanLehn, Jones, & Chi, 1992). These explanations can use information explicitly stated in the text along with other relevant information from the students' own prior knowledge. Research has shown that students who successfully self-explain are more likely to generate inferences, construct coherent mental models, solve problems, and develop a deep understanding of the concepts covered in the text compared to students who do not self-explain or self-explain poorly (Chi et al., 1994; McNamara, 2004). Inferences help students overcome gaps (or breakdowns)

in their own understanding of the text, because they aid students in drawing conclusions about information found in text (Bransford, Brown, & Cocking, 2000; Graesser, Leon, & Otero, 2002; Kintsch, 1998).

Importantly, many students do not spontaneously self-explain texts and, when they do, their self-explanations do not enhance their comprehension (Chi et al., 1994). Hence, Self-Explanation Reading Training (SERT) (McNamara, 2004) is a pedagogical intervention designed to provide students with instruction on comprehension strategies to improve their ability to self-explain text. Five comprehension strategies: comprehension monitoring, predicting, paraphrasing, elaborating, and bridging (described in more detail within Table 7.1), were included in SERT based on research demonstrating their effectiveness in enhancing students' comprehension of challenging text (Brown, 1982; Palincsar & Brown, 1984). The process of self-explaining externalizes students' understanding of the text, which helps them more effectively to learn to use the comprehension strategies (McNamara, 2004, 2009). This symbiotic relationship between self-explanation and comprehension strategies enhances students' ability to comprehend challenging text (e.g., McNamara, 2004; O'Reilly et al., 2006) and consequently perform more successfully in their course exams and state standards tests (McNamara,

TABLE 7.1 The Five Comprehension Strategies in the iSTART-2 Program.

Strategy Name	*Description*	*Example*
Paraphrasing	When students take information in the text and put it in their own words	"*Your chest expands as you take deep breathes*"
Comprehension Monitoring	When students reflect upon what they have read and assess their understanding of the content	"*I understand that muscle contraction causes your chest to expand during a deep breath*"
Prediction	When students make an inference about what information may come next in the text	"*I think that the text will talk about how oxygen fuels the body next*"
Elaboration	When students make an inference about the text based on their own world knowledge	"*When I run, I have to take deep breaths which allows air to move into my lungs and blood stream to fuel my body*"
Bridging	When students make an inference about the text based on the connections they see between separate clauses, sentences, and paragraphs embedded within the entire text	"*Air moves into the lungs when your chest expands and moves your ribs up and out*"

in press; McNamara et al., 2007). The iSTART-2 program leverages the SERT pedagogy to teach the five comprehension strategies mentioned earlier.

Table 7.1 provides brief descriptions of each comprehension strategy, and shows an example self-explanation that might be generated using each type of strategy. The self-explanations in Table 7.1 are generated in response to the following text: the sentence in bold is the *target sentence*, which is the sentence that must be self-explained.

> *Breathing is the process of moving air into and out of the lungs. Inspiration is the process of taking air into the lungs.* ***When you take a deep breath, your chest expands as the muscles contract to move the ribs up and outward****.*

iSTART-2

iSTART-2 is the most recent iteration of the iSTART program.[1] iSTART-2 uses a game-based learning environment designed to enhance students' engagement and persistence during prolonged periods of training (Jackson & McNamara, 2013; Snow et al., 2015). Keeping students interested and engaged during prolonged practice is especially important within classrooms because of the importance of enhancing students' persistence.

iSTART-2 instruction consists of two phases: *training* and *game-based practice*. During the first phase, training, students watch a series of seven videos (lasting a combined total of approximately 35 minutes), which first introduce them to the concept of self-explanation and then provide instruction on each of the five comprehension strategies that students can use to more successfully comprehend challenging content-area texts (e.g., science and history texts). The five strategies covered in iSTART-2 are comprehension monitoring, predicting, paraphrasing, elaborating, and bridging (see Table 7.1). Each training video is narrated by Mr. Evans, a pedagogical agent who defines and explains each reading strategy and gives examples of how students can use the strategy while self-explaining (see Figure 7.1 for screen shot of one of the iSTART-2 strategy training videos). A short quiz follows each video that assesses students' understanding of the specific strategy presented during the lesson video. After completing this initial instructional phase of iSTART-2, students are transitioned to the practice phase within the interactive game-based interface (see Figure 7.2).

Within the interface, students can interact with generative practice games where they read challenging texts (usually science texts) and type self-explanations in response to several target sentences. There are three generative practice environments within iSTART-2: Coached Practice, Showdown, and Map Conquest. These games are designed to maintain students' interest during prolonged generative practice. In Map Conquest, for example, students are asked to compose a self-explanation for numerous target sentences while collecting flags they can use to conquer a map (see Figure 7.3). Students can earn flags in this game by

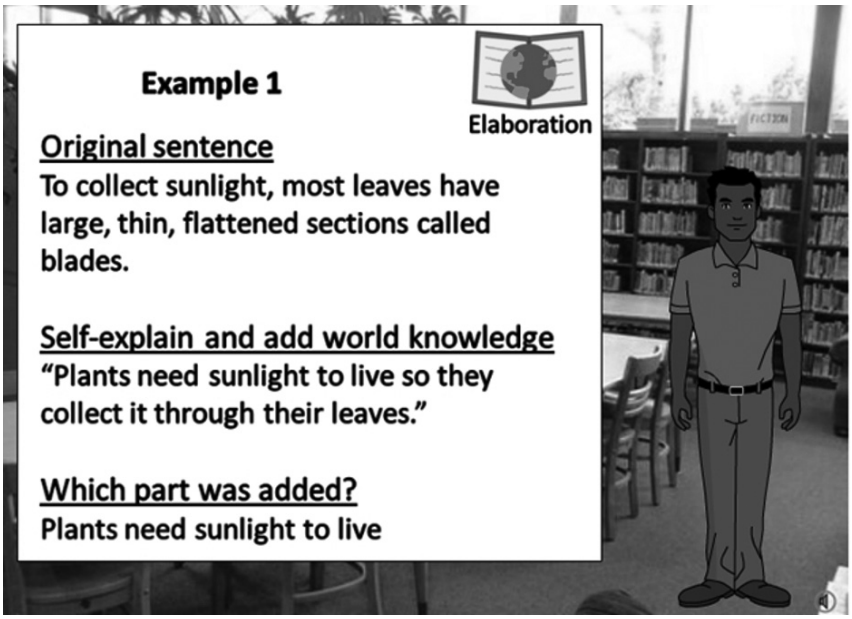


FIGURE 7.1 Screen Shot of One of the iSTART-2 Strategy Training Videos.

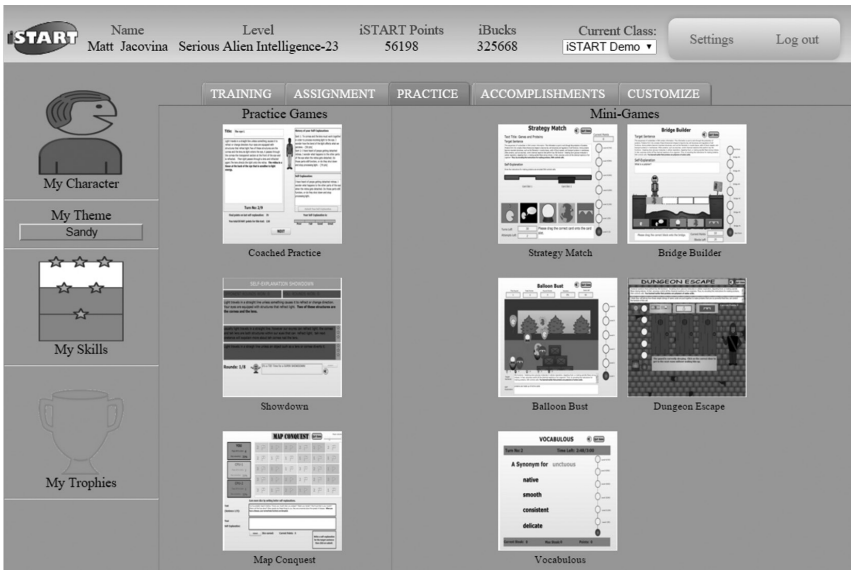


FIGURE 7.2 Practice Phase within the Interactive Game-Based Interface.

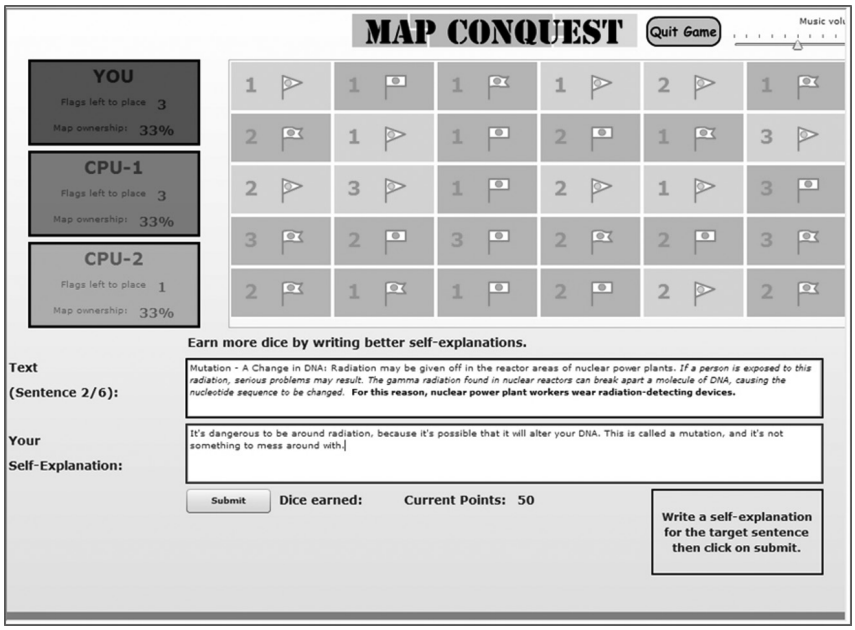


FIGURE 7.3 Map Conquest.

generating high quality self-explanations. All self-explanations are scored using the iSTART-2 scoring algorithm, which automatically assigns a score between 0 and 3 to each self-explanation. This algorithm uses a combination of computational techniques to automatically assess self-explanation quality (McNamara et al., 2007). Higher scores are assigned to self-explanations that use key words and include language related to the text content (both the target sentence and previously read sentences), whereas lower scores are assigned to unrelated or short responses. The scoring algorithm is designed to reflect how well students have established relevant connections between the target sentence and prior text material and prior knowledge of the content. This algorithm has been shown to be comparable to human-scored self-explanations across a wide variety of texts (Jackson, Guess, & McNamara, 2010).

While playing the games, students can earn iSTART points and *iBucks*. The accumulation of points in the system unlocks new features (e.g., additional games, character accessories, and themes) and determines a student's overall level within the system. iBucks serve as a form of system currency. Students can spend their iBucks personalizing the system interface. Personalizable features include the ability to edit an avatar (e.g., choosing a new hair style or shirt color) and to change the interface's background color. These features are designed to engage students during practice of the strategies and also provide them with a sense of agency over their learning environment (Snow, Allen, Jackson, & McNamara, 2015).

Students can also choose to spend their iBucks on a suite of mini-games designed to provide them with practice identifying the reading strategies covered by iSTART-2. Although mini-games vary in their game mechanics, in each students read a text and a self-explanation and then identify the principal strategy used to generate that self-explanation. For example, Bridge Builder is a mini-game where students are presented with a text and a self-explanation, decide which strategy was used to generate the self-explanation, and drag one of five bricks (each labeled with a different strategy) to an empty slot on a bridge (see Figure 7.4). Students also earn iBucks and iSTART points while playing these mini-games.

The Need for iSTART-2

The ability to effectively read and comprehend information found in text is essential for both academic and professional success. However, as stated earlier, national assessments of students' reading skills reveal that students often struggle in this area. For example, more than 25 percent of students in grades 8 through 12 within the United States score at or below a basic level of reading comprehension (US DOE, 2011).

One way to improve students' reading comprehension skills is through prolonged and repetitive practice (Anderson, Conrad, & Corbett, 1989; Newell & Rosenbloom, 1981). The original version of iSTART was successful at improving

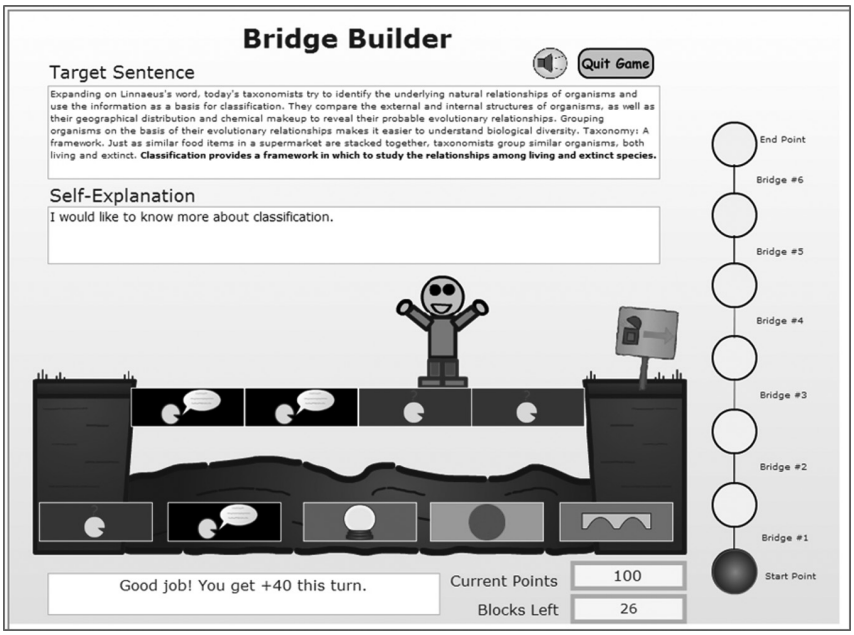


FIGURE 7.4 Bridge Builder.

students' reading ability over time (Jackson & McNamara, 2013; McNamara et al., 2006, 2007). However, one concern about the prolonged practice was that students became disengaged from the learning task before they reached a desirable level of proficiency (Bell & McNamara, 2007). To address this potential disengagement, game-based elements were incorporated into the system (see the iSTART-2 section for a description of the game features; Jackson & McNamara, 2013; Snow et al., 2015). Thus, the iSTART-2 system provides students with the long-term practice needed to improve literacy skills while also providing game-based practice designed to sustain engagement.

The purpose of iSTART-2 is to supplement teacher instruction within the classroom. In the average-sized classroom, it is unrealistically demanding for teachers to provide individualized feedback on how well students are implementing reading comprehension strategies. iSTART-2 provides each student with real-time feedback and instruction concerning their self-explanations. Thus, each student gets personalized instruction from the system without waiting or disrupting the rest of the classroom.

Finally, iSTART-2 helps students meet the Common Core College and Career Readiness standards for reading. For instance, the new Common Core literacy standards for grades 11 through 12 include the need for students to make logical inferences based on information in text, determine the central idea of a text, analyze the structure of texts, and comprehend complex textual information (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). iSTART-2 training is designed to promote each of these principles through self-explanation strategy training (see Table 7.2 for details). Importantly, iSTART-2 focuses on content-area informational texts, which are often difficult for less skilled readers to comprehend.

Research Support

Reading Comprehension and Strategy Acquisition

Our research on SERT, the foundation for iSTART-2, has demonstrated the benefits of self-explanation training for a wide range of students, particularly those who have less knowledge about the topic, or low-knowledge readers. Indeed, across a number of studies, the effects of self-explanation and strategy training have been most evident for low-knowledge students. For example, O'Reilly, Best, and McNamara (2004) conducted a study in which 136 inner-city high school students were randomly assigned to receive either no training (control), SERT, or training to preview the text using K-W-L charts (What do you know? What do you want to know? What did you learn?), which was commonly taught in the targeted schools. The effects of these training conditions were examined on students' comprehension of a science text one week after training. There was an overall benefit for SERT, with no benefit of the K-W-L preview condition in comparison to the control condition. This is important, because it demonstrates that

TABLE 7.2 iSTART-2 and the Common Core Alignment Examples.

Common Core Guidelines:	*iSTART-2 Implementation:*
Key Ideas and Details	
Read closely to determine what the text says explicitly and make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.	iSTART-2 provides students with training on multiple comprehension strategies which are used to monitor one's understanding, understand explicit meanings in text, and to derive within-text inferences as well as inferences using prior knowledge. When inferencing in iSTART-2, learners are required to combine ideas from two or more sentences together. Thus, instruction in the bridging strategy assists learners in identifying the main ideas and themes within a text.
Craft and Structure	
Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.	The inferencing strategy in iSTART-2 is used to link the current sentence being read to previously read sentences from the text. Successfully applying this strategy involves thinking about how sentences in the text relate to one another.
Range of Reading and Level of Text Complexity	
Read and comprehend complex literary and informational texts independently and proficiently.	Within iSTART-2, learners read many texts of varying difficulty and are provided with instruction in the key strategies shown to improve reading comprehension.
Vocabulary Acquisition and Use	
Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate. Acquire and use accurately a range of general academic and domain-specific words.	iSTART-2 comprehension strategies instruct students on how to use context clues, word deconstruction, world knowledge, or common sense, as well as reference materials to figure out the meanings of unfamiliar words in texts. The texts within iSTART-2 are complex domain specific texts that expose students to diverse general language and scientific terminology.

SERT training is more effective than instruction to use the K-W-L previewing strategy. The results also indicated that the benefits of SERT were most pronounced for students with less knowledge about science. Importantly, after training, the low-knowledge students who were provided with SERT understood the science text as well as the high-knowledge students.

McNamara (2004) examined the benefits of SERT (compared to a control condition) with undergraduate college students. After training, the students were asked to self-explain a challenging text about cell mitosis. The results again demonstrated an overall benefit for SERT on students' ability to understand challenging text. In addition, this work indicated that SERT's primary role was in helping low-knowledge students use logic and common sense to self-explain the text. SERT helps students with less domain knowledge to more successfully self-explain texts using effective comprehension strategies. Moreover, as found by O'Reilly et al. (2004), the low-knowledge students who received SERT training *caught up to* the high-knowledge students, showing comprehension scores equivalent to the high-knowledge students after training.

In another study, McNamara (in press) demonstrated that college students enrolled in an introductory biology course with low science knowledge scored higher on the course exams if they had completed SERT (compared to a control condition). The advantages of the comprehension strategies included in the iSTART systems can thus have measurable benefits on students' comprehension and long-term performance in challenging content-area courses such as science.

All versions of the iSTART program have maintained the key ingredients of SERT, with benefits for students' comprehension of challenging science text equivalent to that of SERT (O'Reilly, Sinclair, & McNamara, 2004). The benefits of reading strategy training have been demonstrated for a wide range of students, including middle school, high school, and college students. For example, a study by McNamara and colleagues (2006) examined the benefits of reading strategy training for middle school and high school students' comprehension of science text. In this study, students were randomly assigned to iSTART or to a control condition where they were briefly shown how to self-explain, but were given no strategy training. Students who received the iSTART strategy training generated higher quality self-explanations and performed better on challenging comprehension questions than students who did not. Moreover, students of different ability levels benefitted from iSTART, albeit in different ways. For example, the students who were already strategic readers improved on the more difficult comprehension questions. Less strategic students, however, benefitted from iSTART by improving their ability to answer more surface level questions. Thus, iSTART is helpful for students with a range of ability levels.

Another study with high school students showed that using iSTART over the course of eight sessions led to improvements in self-explanation quality, and the less skilled students caught up to the skilled students in terms of the quality of their explanations (Jackson & McNamara, 2013; Snow, Jackson, & McNamara, 2014). This improvement in self-explanation quality persisted a week after completing the training, suggesting that the effects of iSTART training are not short-lived (Jackson & McNamara, 2013).

Finally, several studies have demonstrated that the reading comprehension training provided by iSTART is effective with college student populations. For example,

one study showed that students who completed the comprehension strategy training improved in their self-explanation ability, and that both more and less skilled students saw improvements (Magliano et al., 2005). Whereas the less skilled students improved in terms of their ability to understand the basic information in the text (i.e., at the textbase level), the more skilled students improved in their ability to understand the text at deeper levels (i.e., at the situational model level). Hence, a wide range of students benefit from engaging with iSTART, and importantly it helps students to make sense of text, even when they are challenged by less familiar domains.

Motivation and Engagement

iSTART-2 is a game-based system designed to maintain students' enjoyment and motivation as well as support the development of their reading comprehension skills (Jackson & McNamara, 2013). A study by Jackson and McNamara (2013) compared the impact of both a game-based and non-game-based version of iSTART on students' reading comprehension and strategy acquisition as well as their enjoyment and motivation across time. Results from this work found that while there were no significant differences in learning gains between the two systems (game and non-game versions), students who participated in the game-based version of iSTART reported higher levels of enjoyment and motivation across time. Thus, the features within the game-based version of iSTART decrease the effects of disengagement that are typically associated with prolonged and repetitive practice (Jackson & McNamara, 2013).

Accessing iSTART-2

iSTART-2 is freely accessible via the web. Teachers can navigate to http://istart.soletlab.com and click on the Teacher Registration link to begin the account creation process (see Figure 7.5). After completing the registration form, a system administrator will approve the account and send additional information about how to begin using the system.

After registering, teachers can log into the system and are transferred to the Teacher Interface (see Figure 7.6). From this interface, teachers can create classrooms, enroll students, assign texts within the system, and view their students' progress. Teachers are also able to view iSTART-2 content through their teacher page, or they are welcome to create a new student account that they can use to test their specific settings.

Creating a classroom is straightforward, only requiring basic information such as the classroom name, a keycode that students can use to join the classroom, and the teacher's school name and location. Teachers can create, view, and organize multiple classrooms within the system. Students can be enrolled into classrooms in multiple ways, for instance, students can create their own accounts and use the

FIGURE 7.5 Account Creation Process.

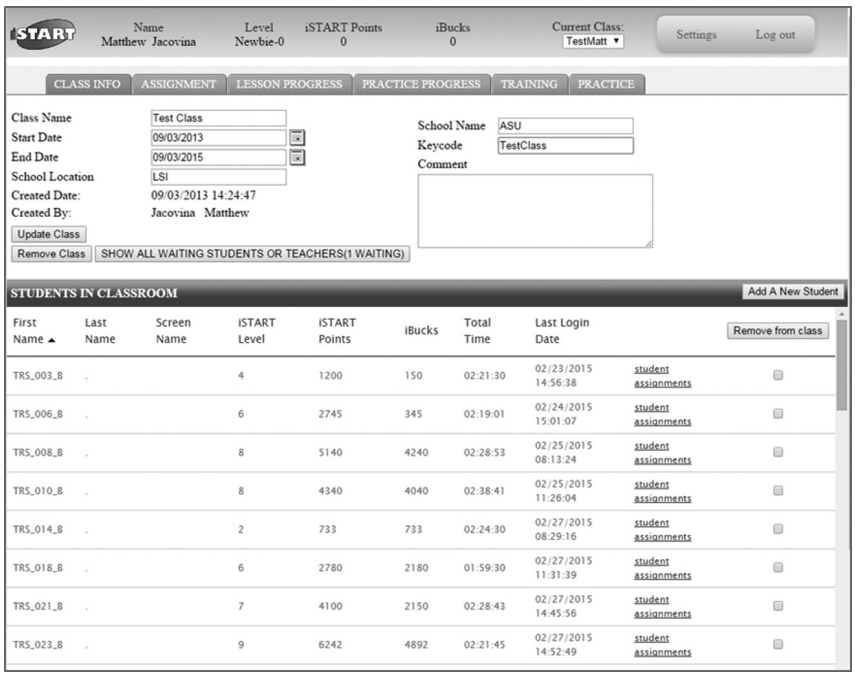


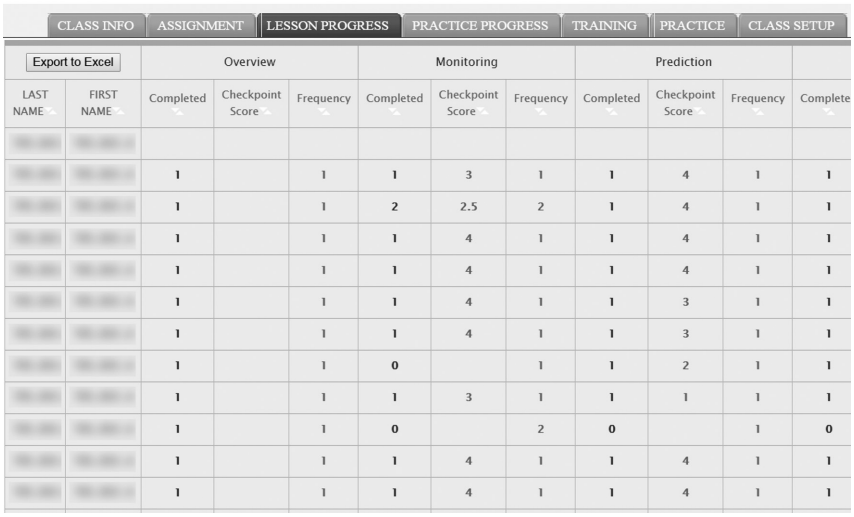
FIGURE 7.6 Teacher Interface.

class keycode to join a particular iSTART-2 class, teachers can individually add students to their classrooms, or teachers can send a spreadsheet with students' usernames and passwords to the iSTART-2 team to have multiple students added at once. This last option may be most optimal for teachers who have many classrooms and students enrolled within iSTART-2.

The Teacher Interface is also used to assign specific texts for students' practice activities. Within the "Assignment" tab, teachers can select texts related to their course for students to cover in either generative and identification games. Alternatively, teachers may choose to not assign any texts, in which case students can choose their own texts or the texts can be randomly assigned by the system. Teachers may also add new, custom texts to the system and assign those to students from the Assignment tab. To add a new text, teachers click on a link to "Create a New Text" and paste their new text into a prompt. Next, iSTART-2 breaks the text into individual sentences (see Figure 7.7). Finally, teachers select the target sentences, which students will self-explain.

Teachers can monitor students' progress as they interact within the system. The main page of the Teacher Interface displays how long students have been in the system, the last date and time they logged in, and their number of iSTART Points and iBucks (see Figure 7.6). Additional information about students' performance can be found on the Lesson Progress, Practice Progress, and Assignment pages. Lesson Progress displays how many of the lesson videos students have completed, along with the score they obtained on the lesson video checkpoint questions (see Figure 7.8). The Practice Progress and Assigment pages are similar to the Lesson Progress page in that they provide summaries of students' actions. For instance, the Practice Progress page summarizes the performance of each

FIGURE 7.7 Example of iSTART-2 Breaking Text into Individual Sentences.



CLASS INFO | ASSIGNMENT | LESSON PROGRESS | PRACTICE PROGRESS | TRAINING | PRACTICE | CLASS SETUP

Export to Excel

LAST NAME	FIRST NAME	Overview			Monitoring			Prediction			
		Completed	Checkpoint Score	Frequency	Completed	Checkpoint Score	Frequency	Completed	Checkpoint Score	Frequency	Complete
[redacted]	[redacted]										
[redacted]	[redacted]	1		1	1	3	1	1	4	1	1
[redacted]	[redacted]	1		1	2	2.5	2	1	4	1	1
[redacted]	[redacted]	1		1	1	4	1	1	4	1	1
[redacted]	[redacted]	1		1	1	4	1	1	4	1	1
[redacted]	[redacted]	1		1	1	4	1	1	3	1	1
[redacted]	[redacted]	1		1	1	4	1	1	3	1	1
[redacted]	[redacted]	1		1	0		1	1	2	1	1
[redacted]	[redacted]	1		1	1	3	1	1	1	1	1
[redacted]	[redacted]	1		1	0		2	0		1	0
[redacted]	[redacted]	1		1	1	4	1	1	4	1	1
[redacted]	[redacted]	1		1	1	4	1	1	4	1	1

FIGURE 7.8 Lesson Progress Page.

student for each of the individual games, along with a count of how many times the games have been completed. Similarily, the Assignment page presents scores for each text that the teacher has assigned to students in the class.

Integrating iSTART-2 in the Classroom

iSTART-2 is designed to help students become more skilled and strategic readers across a broad range of texts, and teachers can employ the system to support these goals as best suits the needs of their classroom and curriculum. Teachers can be flexible in when practice activities are assigned. For instance, some teachers may find it useful to assign iSTART-2 practice during class time while others may prefer to use the system as a homework device or prescriptively when students show signs of struggling with comprehending difficult texts.

We encourage teachers to talk about and practice using self-explanation and the comprehension strategies in the classroom. iSTART-2, like all educational technologies, is more effective when it is integrated into classroom activities. A teacher can implement SERT strategies by explaining and demonstrating self-explanation, and encouraging students to use the comprehension strategies. For example, the teacher can have the students self-explain as a class—calling on students to begin or continue self-explanations and asking students to write out self-explanations for selected sentences in text. Students can also be placed in pairs and asked to take turns self-explaining a portion of the textbook. This is particularly effective if one student self-explains a paragraph and then the other summarizes the paragraph. These simple exercises have important added benefits, particularly for the struggling students.

Teachers' ability to input their own texts further encourages students to practice self-explaining while reading about particularly difficult (but relevant) course content. If teachers would like students to read from course material, we suggest targeting the most challenging sections. The teacher can select (and potentially modify) approximately 20 to 30 excerpts from the textbook that include 16 to 30 sentences, and then choose 8 to 10 sentences from each for the students to self-explain.

However, we do not recommend using iSTART-2 as the sole delivery method for new course content, because iSTART-2 is not designed to provide students with content specific feedback. iSTART-2 improves students' comprehension of challenging course material, in particular science. iSTART-2 also combats misconceptions of science content (Allen, McNamara, & McCrudden, 2015). However, iSTART-2 does not provide direct feedback on potential misconceptions. The scores that students receive during practice are solely indicative of students' use of self-explanation strategies and the depth of comprehension, rather than the accuracy of their understanding. Hence, while the pedagogy of the iSTART-2 program helps students better to understand the material and helps students to learn how to comprehend challenging course material, more is needed for mastery of the material.

Optimal Length of Practice

How much practice do students need? Although the optimal length of practice depends on a variety of factors (e.g., students' prior reading ability, age level, prior knowledge of the domain), in general, after students have completed the 7 instructional videos (~35 minutes) we recommend they engage in about 8 to 10 hours of practice. Spreading this practice across time can also be beneficial, because students would have more opportunities to recognize challenges that they may encounter in their everyday experiences and to recognize when and why self-explanation and the use of comprehension strategies could be helpful.

Conclusion

iSTART-2 provides students with instruction and game-based practice for five self-explanation strategies. These strategies are designed to improve students' reading comprehension skills, particularly for complex texts. The instruction and practice embedded within iSTART-2 complement classroom instruction and provide students with opportunities for extended practice within a game-based environment. These game-based elements have been shown to maintain students' interest as well as increase their motivation over time.

An important element of iSTART-2 is that it provides teachers with multiple ways to use the system. This flexibility allows iSTART-2 to be easily adapted for a variety of age groups and course topics. For instance, the amount of time and

practice required for iSTART-2 training is flexible. This eliminates the need for teachers to spend valuable classroom time assigning texts and complete practice activities. iSTART-2 also affords teachers the ability to choose the content of texts with which students interact or enter their own texts that are a part of their established curriculum. iSTART-2 practice is also adaptive and personalizable; thus, practice activities and meaningful feedback can be adjusted based on students' ability levels.

iSTART-2 is appropriate for a wide range of ability levels, because the strategies target different levels of understanding, and students improve at their proximal level of comprehension ability. The ability for teachers to enter in their own texts affords the opportunity to customize and select texts that match student needs and reading levels. In addition, iSTART-2 is currently being expanded to include strategy instruction in summarization and question asking, strategies shown to be effective for younger readers (e.g., Rosenshine, Meister, & Chapman, 1996; Wade-Stein & Kintsch, 2004). A Spanish version of iSTART-2 is also currently available.

Finally, iSTART-2 is aligned with many of the Common Core College and Career Readiness standards for reading, as well as any number of individual state standards. iSTART-2 provides an individualized and engaging practice environment that promotes mastery of effective comprehension strategies, helps students to recognize the importance of generating logical inferences, determine the central idea of texts, analyze the structure of texts, and comprehend complex textual information. In combination with teacher instruction, iSTART-2 assists in the development of these crucial skills with the goal of helping students achieve both academic and professional success.

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Note

1 iSTART-2 is the third iteration of the iSTART program. While features and mechanics may vary across iterations, each one builds upon the pedagogical techniques in SERT. For more information concerning the various iterations of iSTART, please see Jackson, Boonthum, & McNamara, 2010; Jackson & McNamara, 2013; McNamara, in press; McNamara et al., 2007.

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