Unlocking Reading Success for First Graders: The Power of Interactive Learning Software

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Unlocking Reading Success for First Graders: The Power of Interactive Learning Software

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Article Info	Abstract
	This study examines the impact of interactive reading instructional software (IRIS) on the reading speed of first-grade elementary students. Using a single-group pre-test post-test quasi-experimental design, the research involved 21 days of interactive reading lessons. Observations during the implementation phase helped evaluate the influence of the learning environment, while post-activity interviews provided insights into how the interactive reading setup boosted students' reading speeds. The results showed a significant increase in reading speed for students using the software. Key factors contributing to this improvement included the intelligent course mode, eye exercises, and reading practice features. This study aims to support efforts to improve reading speed, particularly for young learners in elementary school.

Introduction

In today's world, individuals who possess the ability to read accurately, comprehend what they read, have an extensive vocabulary to experience enhanced ease in learning (Çelenk & Çalışkan, 2004: 20; Güleryüz, 2004, p.19). Reading slowly can lead to distractions, boredom, and poor retention of information. Therefore development of this skill constitutes the primary objective of the educational process. In this context, the Turkish language curriculum for first grade, designed to impart reading and writing skills, is seen to place a specific emphasis on teaching reading skills in the first grade, focusing on the domain of learning to read (MoNE, 2019). Rapid reading, thus, becomes one of the significant goals in the process of teaching reading to beginners.

Despite the abundance of activities focused on reading within educational systems, it is noteworthy that students often fail to reach the desired level of reading speed. In this context, within the framework of the Progress in International Reading Literacy Study (PIRLS), research conducted with elementary school 4th-grade students in 35 countries revealed that Turkish students' reading skills were below international standards (Kutlu, Yıldırım, Bilican, and Kumandaş, 2011). In addition, according to the 2018 PISA results, Turkey ranks 40th out of 79 countries in terms of reading skills. Scores in this field range from 340 to 550 across countries (MoNE, 2019). Accordingly, the limitations in the development of reading skills have led educators to explore various methods for enhancing this skill from an early age. The strategies devised to speed up reading are closely linked to the cognitive processes experienced by students during the reading process. In this context, this study has focused on the effectiveness of software developed to enhance reading skills, taking into account these processes.

Cognitive Processes in Reading

Individuals integrate their prior knowledge with the information in the text during reading. They engage in an active process while constructing meaning via reading (Akyol, 2006; Güneş, 2012). Speed reading can be thought of as the ability to accomplish this process in a shorter period. Various definitions of speed reading, which often revolves around the number of words read per unit of time, also encompass comprehension. Considering the definitions; reading speed can be conceptualized as the time taken to comprehend and finish reading a text (Maviş, 2006, p. 40). The relationship between speed and comprehension is indispensable in the skill of reading. When reading speed is developed in this manner, the achieved speed in reading could become a significant component of fluent reading. In this context, Akyol (2006) defines fluent reading as a reading process where attention is given to punctuation marks, emphasis, and intonation, without backtracking or word repetition, devoid of syllable counting and unnecessary pauses, while paying attention to units of meaning, and conducted conversationally. Within this framework, fluent reading can be approached through the dimensions outlined in Figure 1.
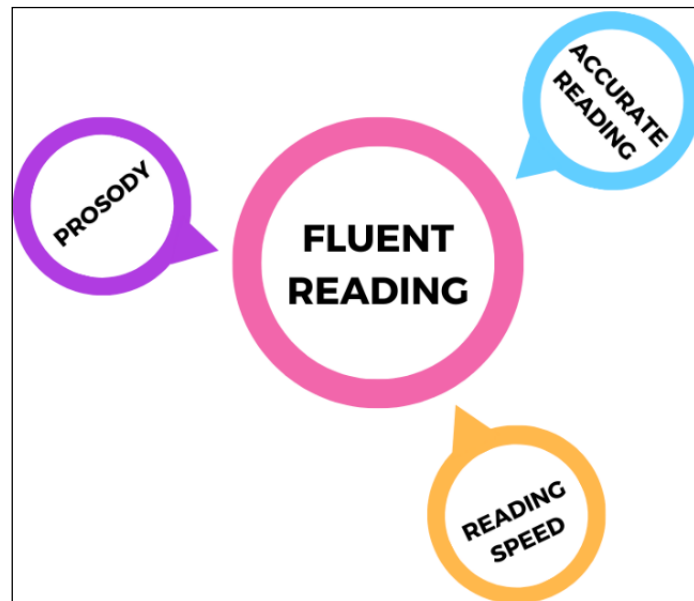

Figure 1. Dimensions of Fluent Reading

To achieve accurate reading as indicated in Figure 1, proper recognition and enunciation of words are essential. Accurate reading also influences the components of fluent reading, namely speed and prosody (Başaran, 2013; Cited in Ertem, 2014). Prosody in reading entails intonation, emphasis, modulation of voice according to comprehension, conforming to punctuation marks at pausing points within sentences, taking into account units of meaning, and maintaining compatibility with the syntactic rules of language (Breznitz, 2006; Dowhower, 1991; Kuhn and Stahl, 2000).

The skill of rapid reading is expected to be proficient in both accurate reading and the realization of prosody. However, due to the inherent difficulty in concurrently measuring these three components, reading speed assessments commonly rely on the count of words read with comprehension per minute. According to Güneş (2007), measuring reading speed in terms of letters is well-suited for Turkish. This is because in Turkish, each

letter is read, making the letter count an appropriate metric. In this regard, Silent Reading Speed per Minute = (Number of words in the text X 60) / Reading duration (seconds) is expressed as outlined by Baran (2013), To this end, the letters of the text to be presented to readers are pre-counted to establish a metric. Assessments regarding how reading takes place can also contribute to activities aimed at improving reading speed. In this context, Richaudeau, Gauquelin, and Gauquelin (1990) explain that individuals read not by smoothly moving their eyes along a straight line of text, but by making jumps and pauses. Thus, reading speed is related to the pauses and jumps the eye makes along the lines, highlighting the significance of focusing on the number of pauses the eye makes on a line and the waiting time during these pauses to enhance reading speed.

Speeding up Young Children's Reading

Various methods have been developed to speed up reading and suggestions have been made for transforming fluency applications that include rapid reading into integrated practices within instructional programs, aimed at enhancing reading skills (Keskin, 2012). Speed reading involves a series of techniques aimed at increasing the word count read per minute without sacrificing comprehension, primarily by expanding the visual process of the eyes and enhancing cognitive processing. In speed reading practices, the eyes are first guided through vertical and horizontal movements, as well as diagonal movements in both directions, to enable more deliberate eye movements across the text. These exercises facilitate conscious eye jumps on the text. Additionally, efforts are made to reinforce the coordination between the eyes and the brain. A progressive approach, ranging from easier to more complex tasks, is pursued to facilitate the transmission of a greater number of words to the brain within a given timeframe (Soysal, 2021, p.132).

In the context of speeding up reading practices, beginners are achieved through various techniques. One such technique, the Six-Minute Method, involves students working with a peer group of similar vocal reading proficiency. This approach helps prevent potential emotional issues that students might face. Observations have indicated that as reading time increases, the number of vocal reading errors tends to rise (Hanzal, 2013; Martin, Elfreth, & Feng, 2014). The method of Reciprocal Reading centers around students systematically re-reading texts multiple times in increasing complexity under adult guidance (Yılmaz, 2006: 23). The teacher corrects the student's vocal reading errors by having them re-read the text. Reader's Theater involves assigning roles to children, which increases reading speed and comprehension while motivating students to read (Young & Rasinski, 2009). In addition, in Paired Reading, students assist each other in reading and try to comprehend the text collaboratively. To guide them, the teacher may provide questions about the content of the text and ask them to answer (N'Namdi, 2005; Güneş, 2007). Another approach is the Neurological Impact Method in which, both the teacher and the student read the text aloud simultaneously. The neurological impact method is significant as it allows children to read without the constant pressure of immediate correction. Another method Fluency-Oriented Reading involves activities such as reading the story aloud in the classroom, discussing it, and using graphic organizers to visualize it. (Stahl, Heubach, & Holcomb, 2005; Cited in: Keskin & Baştuğ, 2012). In Television Reading, the teacher selects suitable texts. Using a previously set-up projection, camera, and computer in the classroom, the activity is executed effectively.

On the other hand; in recent years, digital platforms have been integrated with existing fluency-oriented reading methods. In one such application, Karaoğlu (2022) utilized digital stories using "StoryJumper" as a Web 2.0 tool to enhance fluent reading skills among fourth-grade elementary students. The study concluded that this approach contributed to the improvement of students' reading speed, accuracy, and prosody skills. Another study investigated the impact of word teaching supported by Web 2.0 tools on fluent reading skills. Consequently, it was determined that the reading comprehension and fluent reading skills of fourth-grade elementary students improved (Sağlık, 2022). In studies involving digital environments, the enhancement of reading speed often involves the coordination of eye and brain activities. These techniques are generally suggested to be applied in different languages. In this sense, Turkish, due to its structural and semantic attributes, is notably conducive to speed reading methods and approaches (Öztahtalı, 2011).

Need for Study

Research in the field of reading underscores that reading comprises two closely intertwined mechanisms: seeing and thinking. Studies reveal that if one of these mechanisms fails to develop adequately, the other is also affected (Carver, 1985; Richaudeau et al., 1984). Utilizing digital tools that encourage visualization for seeing and comprehension for thinking could contribute to the development of reading skills in young students. In this context, the development and testing of interactive instructional software become important for educators and instructional designers.

The integration of digital tools that stimulate both visual processing and comprehension could potentially address the challenges associated with reading speed, thereby enhancing students' overall reading experience and motivation. This highlights the significance of continuously improving instructional software to create an effective learning environment for young readers.

Research Problem

The study attempts to determine the impact of interactive reading software on the development of reading skills for first-grade of elementary school students who are just beginning their journey in reading. The research also addresses the factors within the interactive reading instruction environment that contribute to the students' speeding up reading. By investigating these factors, the study seeks to provide insights into the specific elements that play a pivotal role in shaping students' reading speed development within an interactive reading instructional software setting.

Within this scope, the following research questions were directed:
- How do reading activities conducted in an interactive reading instructional software affect students' reading speed?
- What are the factors within the interactive reading instructional software that affect the speeding up students' reading?

Ultimately, the findings of this research hold significance for educators interested in leveraging technology to enhance reading instruction and contribute to the cultivation of proficient young readers.

Methodology

In this study, a single-group pretest-posttest experimental design was employed. The single group of students underwent the IRIS setting. Throughout this process, we tried to ensure that the group did not encounter other methods of enhancing reading skills.

Study Group

A total of 30 (thirty) first-grade students, consisting of 17 girls and 13 boys, enrolled in a primary school participated in the study. By the end of the first semester, students become capable of reading by constructing syllables from letters, forming words from syllables, and creating sentences from words. All of the students in the study group were capable of reading syllables, words, and sentences. Seven students read word by word (syllable-by-syllable reading) while reading.

Consequently, the reading speed of some students before the intervention is below 25 words per minute. The reading speed of six students was above 45 words per minute before the intervention. Considering that the expected reading speed by the end of the first grade is 60 words per minute, these students' reading proficiency can be considered high. The remaining 17 students had a reading speed ranging from 25 to 45 words per minute before the intervention. These students can be categorized as having a moderate level of reading proficiency.

Experimental Procedure

In the study, a narrative text titled 'Çiftçiyle Çocukları' (Farmer and His Children), consisting of 101 words, was utilized as the data collection tool to measure students' reading speed due to its alignment with the vocabulary level of children in the Turkish coursebook provided by the Ministry of National Education (MoNE). Before the implementation, a pre-test of reading speed was conducted. Throughout the intervention, interactive reading instruction software was employed, and a 21-day educational program was carried out with ten activities each day.

On the first day of the intervention, students were introduced to factors influencing reading speed, the significance of reading speed, and how the activities would be conducted. The activities were projected onto a screen, enabling simultaneous participation of all students during two class periods (40+40 minutes). Each activity was projected onto the screen and collectively completed by the students. The activities within the software are summarized below:

In tachistoscopic activities, students were asked about the word or number that appeared on the screen briefly and then disappeared. After the student's response, the teacher displayed the answer on the software. In puzzle

activities, students attempted to find the word puzzles displayed on the screen within a short period. A student raising their hand would quickly come to the board to show the found word, and the teacher would mark the word on the computer. This process continued rapidly for other words as well.

Throughout the activities, the teacher provided encouragement and motivation to students, saying, 'Come on, children! You can do this, I trust you. Believe in yourselves.' In certain activities, instructions like 'Yes, children! We are carefully following the objects. Pay attention. Don't miss anything.' were given. At the end of eye-related activities, students' eyes might become tired. In such cases, instructions like 'Children, quickly rub your hands together and then place them over your eyes. You will feel warmth, and your eyes will relax.' were given to help them rest their eyes.

Data Collection

At the instructional phase, a pretest was administered, and after the culmination of the twenty-one-day intervention, a post-test measurement of students' reading speeds was conducted. Interviews were conducted with selected students to elucidate the facets of the IRIS that contributed to their increase in reading speed. Interviews were conducted with the selected students after all activities to elucidate the facets of the interactive reading instruction environment that contributed to their improvements in reading speed. The research process is shown in Figure 2.
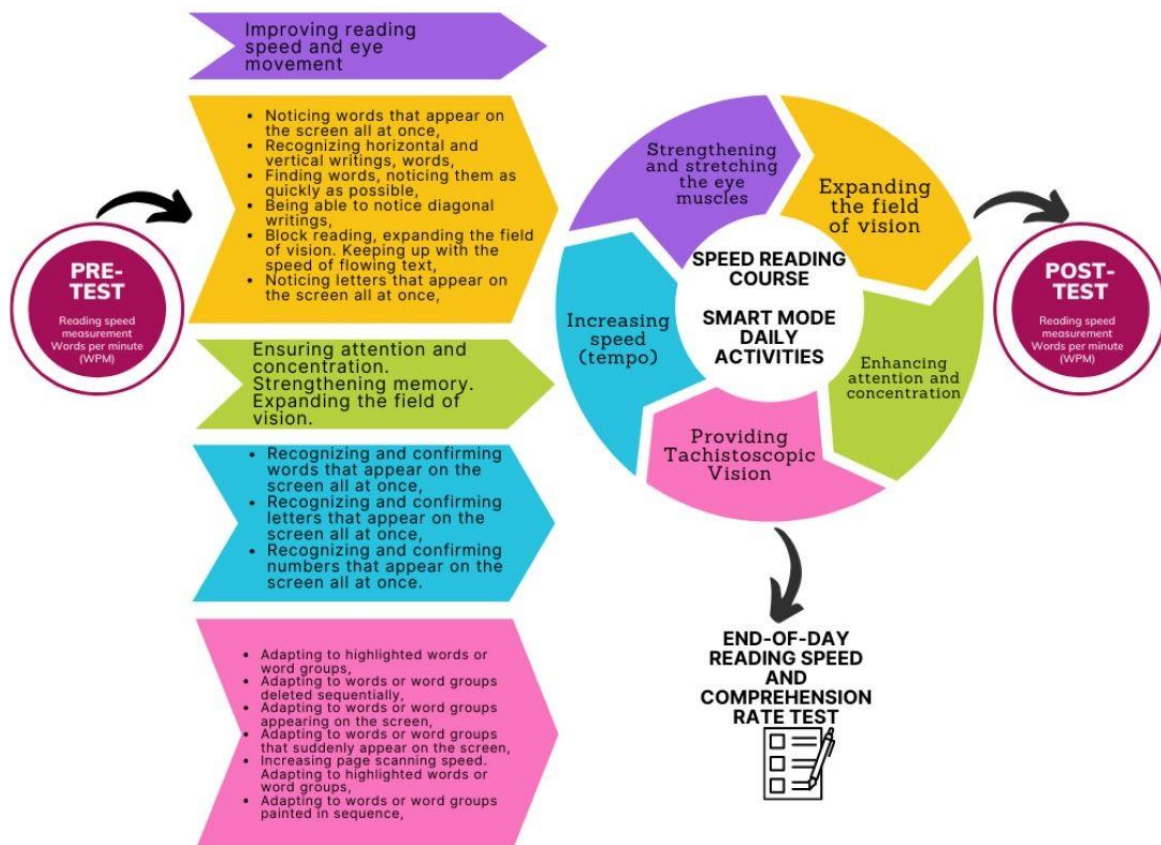

Figure 2. Research Process, Implemented Interventions, and Data Collection

Interactive Reading Instructional Software

The interactive reading instructional software utilized in this study initiates by conducting pre-intervention reading speed measurements and daily reading speed goals based on these measurements. The software presents activities in a gamified manner, ensuring an engaging experience. Upon completion of activities, participants are rewarded with point-based incentives, and a ranking and grading system is established based on accumulated points among the program users. The software maintains daily records of activity outcomes and presents them through progress graphs. Following the execution of daily activities, a reading speed test is administered at the end of each day. The initially established reading speed goals at the commencement of the program are subsequently revised based on the results of these tests, thereby undergoing potential modifications.

As depicted in Figure 3, upon accessing the designated day, ten activities are displayed, which can be sequentially completed. Transitioning to the subsequent activity necessitates the completion of the ongoing one. Activities can be repeated as desired.

Figure 3. Daily Activity Implementation Page of the Software

The software primarily encompasses activities in the following domains.

Activities

Activities predominantly encompass a variety of exercises that primarily appeal to visual perception. The distinguishing characteristics of these activities are delineated in Figure 4.
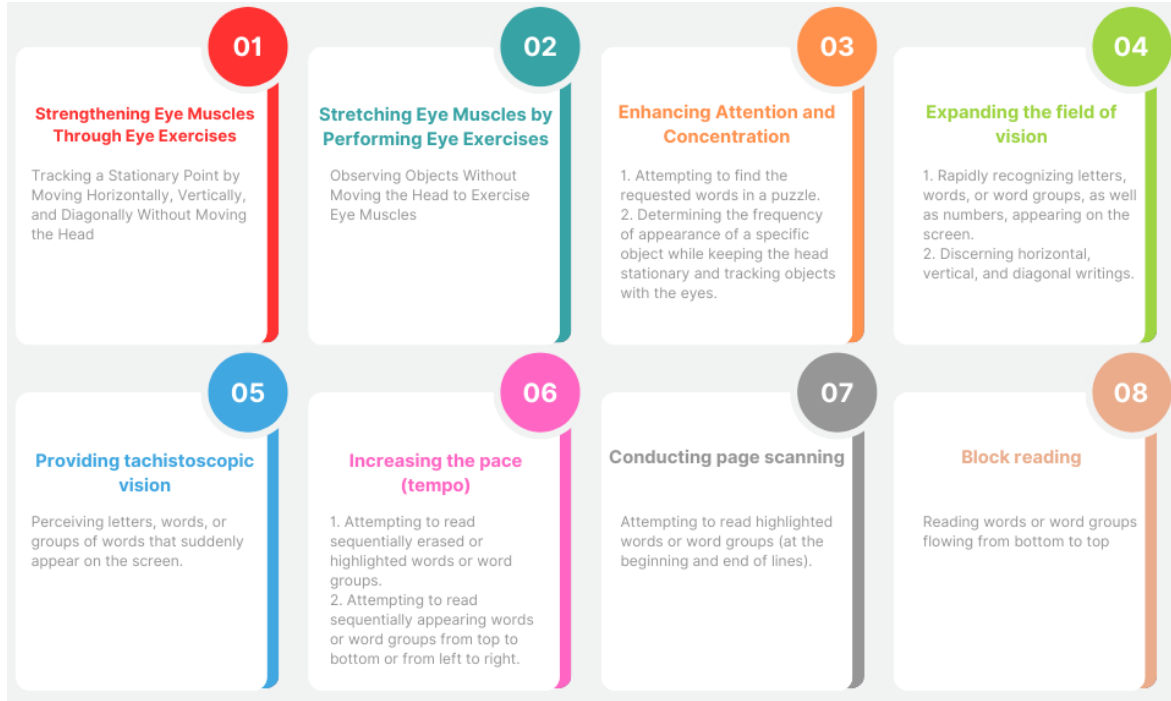
Figure 4. Activities and Their Characteristics

One of the significant components of the software pertains to reading exercises. The tasks in the activities encompassed within this section are succinctly summarized below.

Reading Tasks

Reading activities are summarized in Table 1.

Table 1. Reading Tasks

	▪ Flowing Texts The words belonging to the text are displayed on the screen one by one in sequence. An attempt is made to read them based on the reading speed.
	▪ Erased Texts The entirety of the text is displayed on the screen. Based on the reading speed, words are sequentially erased one by one. It is required to read the words before they are erased.

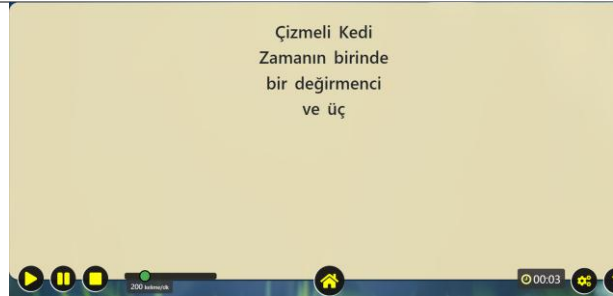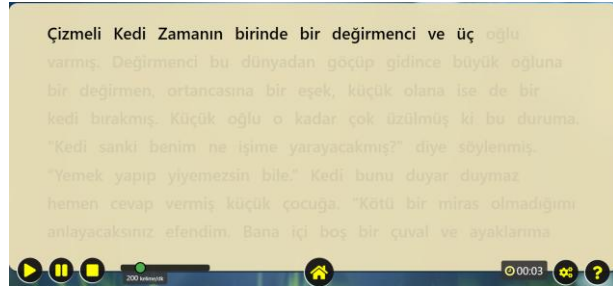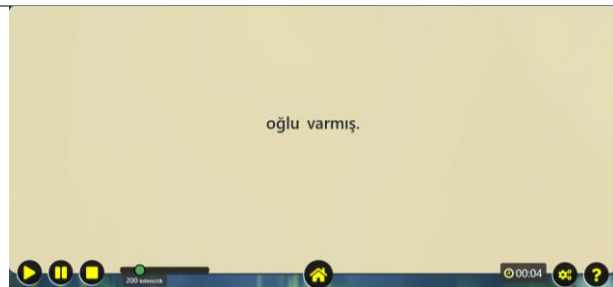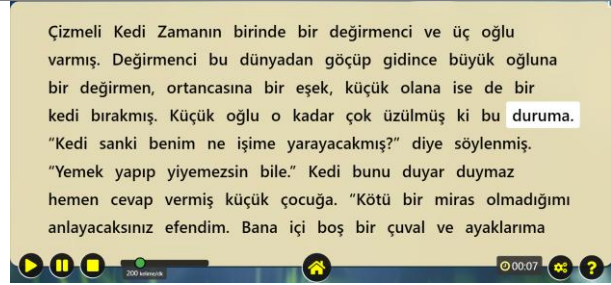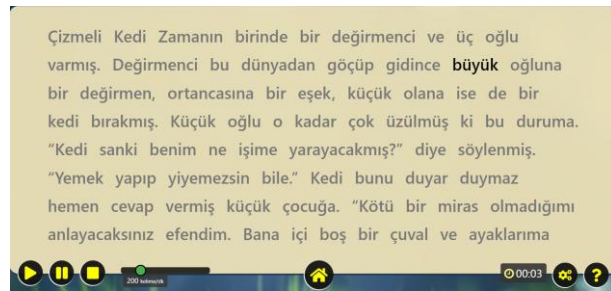|	
Çizmeli Kedi Zamanın birinde bir değirmenci ve üç oğlu varmış. Değirmenci bu dünyadan göçüp gidince büyük oğluna bir değirmen, ortancasına bir eşek, küçük olana ise de bir kedi bırakmış. Küçük oğlu o kadar çok üzülmüş ki bu duruma. "Kedi sanki benim ne işime yarayacakmış?" diye söylenmiş. "Yemek yapıp yiyemezsin bile." Kedi bunu duyar duymaz hemen cevap vermiş küçük çocuğa. "Kötü bir miras olmadığımı anlayacaksınız efendim. Bana içi boş bir çuval ve ayaklarıma ▶ ❚❚ ■ 200 kelimecik ⌂ ⏱00:07 ⚙ ?	▪ **Highlighted Texts** The text appears faintly on the screen. Based on the reading speed, words are sequentially highlighted one by one, and an attempt is made to read them.
Çizmeli Kedi Zamanın birinde bir değirmenci ve üç ▶ ❚❚ ■ 200 kelimecik ⌂ ⏱00:03 ⚙ ?	▪ **Scrolling Words** The words belonging to the text emerge one by one from the top to the bottom. The words are attempted to be read based on the reading speed.
Çizmeli Kedi Zamanın birinde bir değirmenci ve üç oğlu varmış. Değirmenci bu **dünyadan göçüp** gidince büyük oğluna bir değirmen, ortancasına bir eşek, küçük olana ise de bir kedi bırakmış. Küçük oğlu o kadar çok üzülmüş ki bu duruma. "Kedi sanki benim ne işime yarayacakmış?" diye söylenmiş. "Yemek yapıp yiyemezsin bile." Kedi bunu duyar duymaz hemen cevap vermiş küçük çocuğa. "Kötü bir miras olmadığımı anlayacaksınız efendim. Bana içi boş bir çuval ve ayaklarıma ▶ ❚❚ ■ 200 kelimecik ⌂ ⏱00:05 ⚙ ?	▪ **Emphasized Texts** The text appears faintly on the screen. Based on the reading speed, words are sequentially emphasized one by one, and an attempt is made to read them.
Çizmeli Kedi Zamanın birinde bir değirmenci ve üç oğlu varmış. Değirmenci bu dünyadan göçüp gidince büyük oğluna bir değirmen, ortancasına bir eşek, küçük olana ise de bir kedi bırakmış. Küçük oğlu o kadar çok üzülmüş ki bu duruma. "Kedi sanki benim ne işime yarayacakmış?" diye söylenmiş. "Yemek yapıp yiyemezsin bile." Kedi bunu duyar duymaz hemen cevap vermiş küçük çocuğa. "Kötü bir miras olmadığımı anlayacaksınız efendim. Bana içi boş bir çuval ve ayaklarıma ▶ ❚❚ ■ 200 kelimecik ⌂ ⏱00:03 ⚙ ?	
oğlu varmış. ▶ ❚❚ ■ 200 kelimecik ⌂ ⏱00:04 ⚙ ?	▪ **Visible Words** The words belonging to the text appear one by one in sequence at the center of the screen based on the reading speed and then disappear. These words are attempted to be read according to the reading speed.
ve üç ▶ ❚❚ ■ 200 kelimecik ⌂ ⏱00:03 ⚙ ?	▪ **Tachistoscopic Reading** The words belonging to the text appear one by one in sequence at the center of the screen based on the reading speed and then disappear. These words are attempted to be read according to the reading speed.
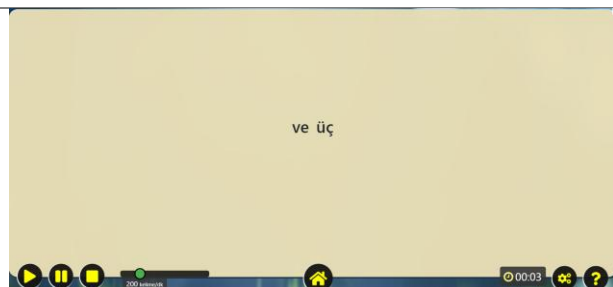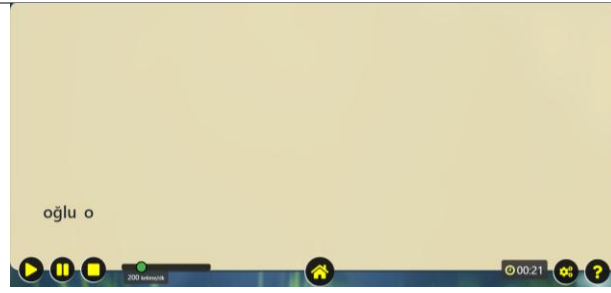
oğlu o	**▪ Random Words** On a white screen, various words written in black tones appear at any point on the screen. Thus, words are read from the upper right corner to the lower left corner, and an attempt is made to increase the reading speed.
Çizmeli Kedi Zamanın birinde bir değirmenci ve üç oğlu varmış. Değirmenci bu dünyadan göçüp gidince büyük oğluna bir değirmen, ortancasına bir eşek, küçük olana ise de bir kedi bırakmış. Küçük oğlu o kadar çok üzülmüş ki bu duruma. "Kedi sanki benim ne işime yarayacakmış?" diye söylenmiş. "Yemek yapıp yiyemezsin bile." Kedi bunu duyar duymaz hemen cevap vermiş küçük çocuğa. "Kötü bir miras olmadığımı anlayacaksınız efendim. Bana içi boş bir çuval ve ayaklarıma	**▪ Page Scanning** The text appears on the screen. Words at the beginning and end of each line are successively highlighted. An attempt is made to read them. In this activity, the entire text is not attempted to be read.
Çizmeli Kedi Zamanın birinde bir değirmenci ve üç oğlu varmış. Değirmenci bu dünyadan göçüp gidince **büyük** oğluna bir değirmen, ortancasına bir eşek, küçük olana ise de bir kedi bırakmış. Küçük oğlu o kadar çok üzülmüş ki bu duruma. "Kedi sanki benim ne işime yarayacakmış?" diye söylenmiş. "Yemek yapıp yiyemezsin bile." Kedi bunu duyar duymaz hemen cevap vermiş küçük çocuğa. "Kötü bir miras olmadığımı anlayacaksınız efendim. Bana içi boş bir çuval ve ayaklarıma	
Oku Anla Sev Düşün Farket **Gülümse** Rahatla Atik ol Farklı ol Meyve ye Güzel gör Suyu sev	**▪ Block Reading** Words or groups of words appear in the center area of the screen. The words can be single, paired, tripled, or even more. Word groups are attempted to be read based on the reading speed.

In this section, activities have been designed to present various texts with distinct characteristics for word, passage, and block readings, each associated with reading fluency.

Data Collection Instruments

Reading Speed Test: The reading speeds of 30 students were measured through pre-test and post-test assessments. The text used for this test is a narrative text titled "Çiftçiyle Çocukları" (The Farmer and His Children), consisting of 101 words, selected from the Turkish language textbook of the Ministry of National Education (MoNe). The number of words read by each student in one minute was determined. Following the pre-test measurement, the implementation commenced. The students' reading speed was measured and each student was individually instructed to read the entire text. The measured time was recorded in seconds. Reading speed is the number of words read in one minute To calculate the student's reading speed, the following formula was used:

Reading Speed = 60 (1 minute) x 101 (number of words in the text)/ Measured time (seconds)

The average reading speed of students has been introduced as the reading speed in the software. The software automatically generates activities based on the average speed.

Data Analysis

The improvement in students' reading speeds was primarily presented through descriptive statistical values. The normality of the pre-test and post-test data was assessed using the Shapiro-Wilk normality test, and it was determined that the data exhibited a normal distribution for both the pre-test ($p=.293$, $p>.05$) and the post-test ($p=.143$, $p>.05$). Evaluations regarding the existence of a significant difference between the pre-test and post-test scores were determined using the dependent samples t-test.The criteria provided for grade 1 elementary school students (Güneş, 2007) were employed to determine the level of reading speeds among primary school grade 1 students. According to these criteria, the oral reading rates of primary school grade 1 students were measured for the narrative text.

Results

The data obtained from the study group were analyzed using appropriate statistical methods, and the findings were presented by tabulating the results.

Changes in Students' Reading Speed

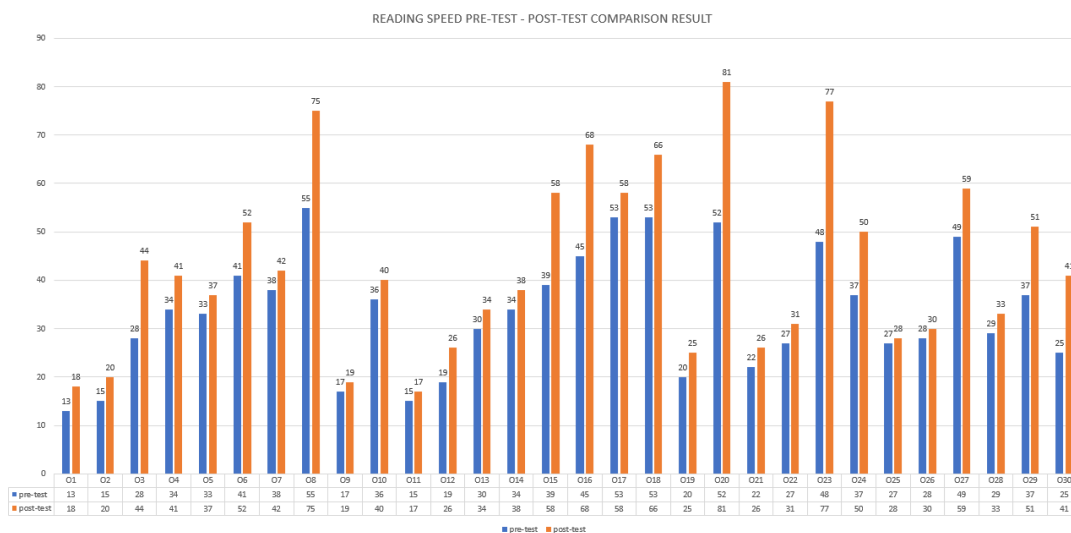A Comparison of students' pre-test and post-test reading speed scores is presented in Figure 5.

Figure 5. Students' Reading Speed Pre-test and Post-test Measurements

The number of words read in one minute ranged from a minimum of 13 to a maximum of 55 in pre-test results. The average reading speed of students was found to be 33.31 words. According to the post-test results of the reading speed measurements applied to students, the number of words read in one minute ranged from a minimum

of 17 to a maximum of 81. The average reading speed of students was found to be 42.83 words.

It is seen that; there was an increase in reading speed for all students. The progress is observed to be less significant for students with a reading speed below 25 words, while it is more pronounced for students with a reading speed above 25 words. The differences in the average pre-test and post-test scores of students are presented by group in Figure 6.
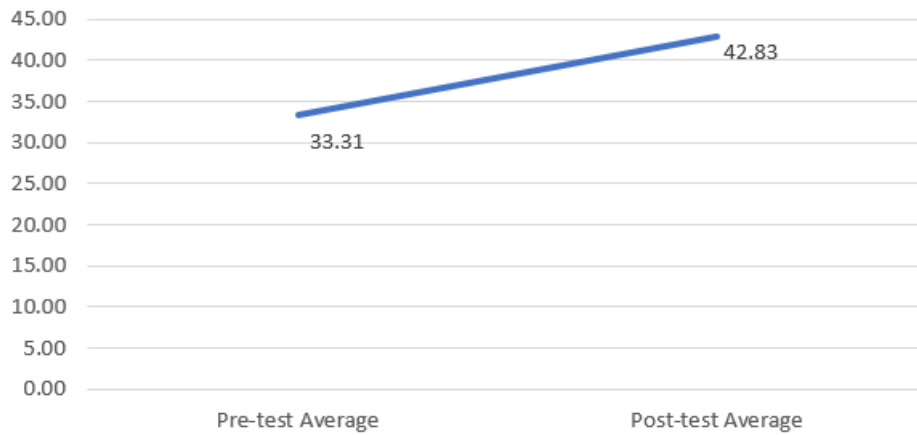

Figure 6. Comparison of Pre-test and Post-test Reading Speed Averages

The statistical differences between the scores obtained by students from the pre-test and post-test are presented in Table 2.

Table 2. Paired Sample T-test Results for the Problem

Experimental Group	N	X	Ss	sd	t	p
Pre-test	30	33,31	12,369	29	- 6,521	.000*
Post-test	30	42,83	18,368			

* p<.01

In Table 2, a Paired Sample t-test was applied to the pre-test and post-test results of the group students before and after the implementation of the reading activities. The average pre-test reading speed (X=33.31) and the average post-test reading speed (X=42.83) were determined for the group. A statistically significant difference between these two averages was found through the t-test at the 0.01 significance level (p<.01, p=.0). It is evident that the post-test reading speeds of the students are higher. This finding indicates that rapid reading training has a positive effect on increasing students' reading speeds. In addition, the gender differences are also investigated via the independent samples t-test.

The results show that no significant difference between the pre-test results of students based on gender (p<0.01, p=0.148). Despite the higher average reading speed of male students (X=37.08) compared to female students' averages (X=30.44), a significant difference was not found between them. Also, there is no significant difference between the post-test results of students based on gender (p<0.01, p=0.036). The higher average reading speed of

male students was (X=50.77) and that of female students was (X=36.76), indicating no significant difference between them.

Table 3. Independent Samples T-test Results by Gender for the Problem

Experimental Group	Gender	N	X	Ss	t	p
Pre-test	Male	13	37,08	11,920	1,487	.148*
	Female	17	30,44	12,266	1,493	
Post-test	Male	13	50,77	17,964	2,203	.036*
	Female	17	36,76	16,709	2,181	

* $p < .01$

Factors Influencing Increases in Students' Reading Speed

During the activities, the teacher observed the students' behaviors and provided instructions when necessary. It was observed that students who actively participated in the activities showed more interest in reading. For example; the puzzle activity was particularly well-received by students. Among the tachistoscopic activities, the activity involving recognizing numbers seemed to be more appealing to students compared to syllable and word recognition activities. In block reading exercises, some students struggled slightly while reading aloud, while others read silently. Additionally, during reading exercises, some students read silently while others read aloud. Eye exercises in which all students participated were conducted to stretch and strengthen eye muscles, enhance eye agility, and widen the field of vision. Students' responses to questions related to these exercises indicated that exercises such as widening their field of vision and being able to look at several words simultaneously had a positive impact on their reading speed and comprehension. For instance, Student S1 mentioned, "It helps me see words in a wider area," and S3 expressed, "It helps me recognize letters." These responses indicated that eye exercises contributed to the ability to see words in a broader field and focus on multiple words simultaneously.

The "Words Disappearing in Order" activity aimed primarily to increase reading speed. This activity was applied 15 times during the 21-day program, lasting approximately 75 minutes in total, depending on the length of the text. After completing this activity, students who were interviewed expressed that the activity positively influenced their desire to read faster. Student S3 mentioned, "It's my favorite activity. The disappearing words make me want to read without hesitation. I get excited."

During the "Finding Displayed Words" activity, a significant number of students participated by actively finding and pointing out words on the screen. Students believed that this activity contributed to their ability to quickly identify and comprehend words. In this sense, S5 stated, "It speeds up my reading" and "Words appearing in different places make me more attentive" Positive feedback like this suggests that the interactive reading application prompted students to react more quickly to words displayed on the screen.

Similarly, regarding the "Tachistoscopic Sight" activity, S4 commented, "It's very fun, like a game," and "Seeing the letter suddenly makes me curious." And S7 stated, "It makes me look carefully and see," "It's easier to read

short numbers than letters," and "Seeing numbers is easier when they're farther from the dot." These observations indicate that the application contributed to generating curiosity, especially regarding letters and words.In the "Words Being Painted in Sequence" activity, the advantage of skipping parts that were difficult to read was highlighted. S5 stated, "It helps me read faster," "I skip unreadable words and continue with the next word," "I can see words better because they're painted," and "Because it's painted, I don't skip lines." Similarly, for the Block Reading activity, S8's comments such as "It challenges me to move downward," "Reading words one by one downward is easier," and "It makes me read faster" underline the positive effects of the exercises on reading speed.

In summary, the IRIS's various dimensions seem to contribute positively to increasing reading speed. Students emphasized the gamified structure of the environment and the impact on their motivation and ability to recognize words. Moreover, active student participation was evident throughout the activities.

Discussion

This study examined the effects of the implementation of an IRIS on the development of fluent reading skills. The results have shown a statistically significant increase in students' reading speeds compared to the pre-test. This indicates that reading activities are beneficial in terms of enhancing reading speed. One of the significant contributing factors to this positive impact is believed to be the reiterative nature of words or texts across various activities within the software. Similarly, in other studies, the technique of word repetition is useful in correcting oral reading errors, enhancing fluency, and improving reading comprehension skills (Sağlam, Baş, & Akyol, 2020). In this context, Akyol (2006) emphasizes that proficient readers can read a text at an appropriate speed, thereby saving time.

Within the study, one of the prominent factors in the development of reading fluency is visual agility. It is assumed that visual agility is achieved in the software by directing students' attention rapidly, keeping their minds alert to catch the words, and aiding in word recognition. The activities involving tachistoscopic vision require rapid identification of words or numbers. Similarly, activities such as the puzzle exercise prompt quick efforts to locate words in the environment, and sequentially erased, scrolling, and visible word activities encourage rapid word reading by increasing visual agility. Additionally, the random words activity increases visual agility as students strive to identify words appearing in different places. These activities encourage students to exert effort to achieve the necessary speed for this process, leading to the positive development of their visual agility.

Another significant contribution of the interactive reading environment is expanding the field of vision. Expanding the field of vision is considered important for better tracking of word groups or text, reducing eye movement, preventing eye strain, scanning text faster to capture important sections, enhancing visual memory by observing more words simultaneously, and comprehending different parts of the text together to understand their relationships better. For instance, the "Count the eggplants" activity involves various objects appearing on the screen, including sporadic eggplant images that need to be counted. This activity aims to expand the field of vision. In the letter recognition exercise, a fixed point remains in the center while letters move away from the

point in a square shape. Block reading exercises also attempt to expand the field of vision by reading vertically appearing words or word groups. Similarly, tachistoscopic exercises display a letter, word, or number on the screen and then it disappears. These activities include flowing text, erased text, colored text, highlighted text, scrolling words, and visible words. In these activities, words appear one by one and are read at a pace suited to the student's reading speed. If desired, the number of words displayed at once can be increased, allowing two or three words to be shown simultaneously. Consequently, the number of words perceived by the eye increases, thus expanding the field of vision. As the student's reading speed increases, words appear at that pace, and the student strives to read faster. Eye exercises conducted in the reading instruction environment have improved students' visual agility and expanded their field of vision, contributing to increased reading speed. Reading exercises, particularly block reading exercises, can be considered to have significant contributions to reading speed. During this process, students consider the narrowing or widening visual areas to capture words and react to encounter situations, which can be evaluated as a significant contribution of the interactive environment to expanding the field of vision within the context of reading fluency. The findings of this study align with the work of Çelik (2022), who researched web-supported rapid reading exercises involving the expansion of the visual field in a digital environment.

In this study, it is also evaluated that learning words, recognizing words, and gaining familiarity are crucial points in the increase of reading speed. Seeing similar words in different activities may encourage students to become closer to these words in terms of meaning and pronunciation. The gamified structure of the software used in this study might have enhanced students' interest and motivation, resembling a sense of playing a game. This situation is believed to trigger the desire to increase speed, thus contributing to increased reading speeds.

One of the activities used for the development of the software is the page scanning activity. In this activity, even a long text can be completed quickly, as only the first and last words of the line are read. The objective of this activity is more about scanning the page than reading; it aims to skim the content. Although this activity aims to enable whole-page viewing, the absence of entirely positive evaluations of students in terms of fluency improvement might be due to their inability to fully comprehend the text through just scanning and not reading comprehensively through sentences. Providing breaks between activities and allowing students to rest during the process, considering their limited attention span due to being first-grade students, has likely facilitated the completion of activities without much difficulty.

The study found no significant difference in the reading speeds of first-grade students based on gender. This aligns with the findings of previous studies by Yılmaz (2006), Demirci (2008), Saracaloğlu et al. (2011), and Ağaçkıran (2016) that also found no significant gender-based differences in reading speed. Both female and male students participated in the instructional program in the same manner, completed the same content together, read the same texts, and performed the same exercises. Given these factors, it can be stated that there would be no significant gender-related difference in terms of reading speed.

To conclude, it can be argued that the IRIS has positive contributions to the development of reading speed, with both its visual and field-related effects. These findings are consistent with the findings of Değirmenci (2014) who

observed a significant increase in the reading speeds of first-grade students through educational software, and Sağlık (2022) who reported similar results regarding the enhancement of reading speeds among fourth-grade students through word teaching supported by Web 2.0 tools. However, the lack of significant improvements in the rapid reading skills of children studying in disadvantaged areas through digital stories in Çiftçi (2019), and the absence of significant effects of digital stories on the reading skills and attitudes towards reading of third-grade students in Şentürk Leylek (2018: 94-97) indicate that targeted features directly addressing vision and the field might contribute to reading speed within such environments.

This research is distinct from others as it specifically targets the improvement of reading speeds of first-grade students, however, it may have some limitations. One of them is the limited number of students, making it challenging to generalize the evaluations of the positive contributions of the IRIS to reading speed development. However, the small number of students, the joint completion of activities, and the observation of each student's performance during data collection have facilitated a more in-depth analysis.

Conclusion and Recommendations

This study has investigated the effects of an IRIS on the increase of reading speed of 1st-grade students. In this context, the findings of the research indicate the following results: In the IRIS, students' reading speeds have statistically significantly increased compared to their reading speeds before receiving the instruction, thereby making a positive contribution to the fluency of reading in interactive reading environments. No significant difference has been found in the pre-and post-instruction reading speeds regarding gender. Thus, the interactive reading environment has enhanced visual acuity and expanded the active field of view, thereby exerting a positive influence on reading speed. In addition, the tachistoscopic activities within the interactive reading environment have contributed positively to reading speed by enhancing attention and concentration.

In this study, the fact that the work was conducted in groups might have limited the extent to which students with lower reading proficiency could benefit. Therefore, providing each student engage in activities using a personal computer or tablet could be significant in yielding more effective results. The duration of the education in this study lasted 21 days. Throughout this period, the limited repetition of certain activities may have constrained the impact of implementation. Ultimately, it is hoped that this study will offer insights to educators who aspire to enhance the teaching of rapid reading.

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