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EFFECTS OF DIGITAL STORYTELLING ON READING COMPREHENSION SKILLS: A QUASI-EXPERIMENTAL STUDY WITH PRIMARY SCHOOL STUDENTS

Okan SARIGÖZ

Assoc. Prof. Dr., HMKU, Hatay, Türkiye, osarigoz@mku.edu.tr
ORCID: 0000-0002-1616-9789

Bilal YILDIRIM

Dr., HMKU, Hatay, Türkiye, byildirim@mku.edu.tr
ORCID: 0000-0002-4660-0904

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ABSTRACT

The aim of this study was to investigate the effects of using digital storytelling into Turkish lessons on the reading comprehension skills of second-grade primary school students. With a pre-test and post-test control group, a quasi-experimental study design was used to achieve this. The sample of the study consisted of 70 second-grade students from two different classes in a primary school in Hatay, Türkiye. Each of these classes consisted of 35 students and they were randomly assigned to the control and experimental groups. While the lessons in the control group were taught bases on current curriculum with written materials such as books and notebooks, the lessons in the experimental group were enriched with digital storytelling. The "Reading Comprehension Scale" (RCS) was applied as a pre-test and post-test for both groups. The analysis of data showed no statistically significant difference in the mean pre-test scores between the groups. There was an increase in the post-test scores of both the experimental group and the control group. However, the average post-test scores of the experimental group were significantly higher than those of the control group. Furthermore, the difference between the pre-test and post-test scores in the experimental group indicated that digital storytelling moderately improved students' reading comprehension skills. These findings suggest that digital storytelling is an effective tool for improving reading comprehension skills. Based on the results, it is recommended to expand the use of digital storytelling to better prepare students for a digitally oriented world and enhance academic performance. To maximise the benefits of such technologies, it is also advised to develop specialised digital materials, establish adequate technological infrastructure in schools, prioritise teacher training in digital tools, and promote collaboration with families.

Keywords: Digital storytelling, digital materials, instructional technologies.

Corresponded Author: Dr. Bilal YILDIRIM, Hatay Mustafa Kemal University, byildirim@mku.edu.tr.

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INTRODUCTION

Increasing academic achievement and effectiveness in education is one of the most discussed topics. In many theories or models put forward on the subject, attention has been drawn to many different variables related to success in education (Cengiz, et al., 2015; Sarıgöz, 2013). However, one of the most significant of these variables is undoubtedly reading comprehension skills. In Bloom's "Mastery Learning Model", the quality of teaching is associated with 'cognitive entry behaviors' (Özçelik, 1998) which are related to reading comprehension. Similarly, within the framework of Gagne's "Gagne's Nine Events of Instruction" (Hesapçioğlu, 1994), a relationship is established between learning and reading comprehension (cognition). On the other hand, Carrol's principles for the "Model of School Learning" are closely related to an individual's reading comprehension (Akpınar, 2010). For this reason, the Ministry of National Education (MoNE) has added common skills associated with reading comprehension to primary education curricula (MEB, 2009). Considering that reading and reading comprehension skills constitute the backbone of school programs (Güneş, 2009), the importance of these common skills will be better understood.

As mentioned above, as many educational theories and models point out, reading comprehension has a critical importance in an individual's academic development (Özçakmak & Sarıgöz, 2019). Reading comprehension is a basic and academic skill that is related to or complements an individual's reading activity. This skill is defined by Yılmaz (2008) as "using prior knowledge to decode the thoughts intended to be given in texts and to attribute meaning to them", while according to Çifti (2007), "reading comprehension, which is similar to a research on the text, is expressed as trying to understand the main idea and subject of the text" (cited in Göktaş, 2010: 21). As can be seen, the process of reading comprehension, which is in a sense a problem-solving skill, is an ability of analysis or interpretation that establishes a cause-and-effect relationship between reading and comprehension.

In the view of Smith and Dechant, reading comprehension skill is composed of elements such as establishing a relationship between text and its meaning; deciphering the meaning of idioms, sentences, paragraphs and texts; integrating parts of the text; understanding the author's purpose and feelings; and relating what they understand to their own experiences (Dökmen, 1994: 25). Reading comprehension is not only a language and communication skill but also the key to an individual's academic success in many subjects and is even closely related to life success. For this reason, many methods, strategies, and techniques are used to enhance reading comprehension in order to increase academic success in school. Considering the problems experienced in reading comprehension in our country, especially at the first level of primary education (Yılmaz, 2008), it can be understood how important efforts in this direction are. Sidekli and Çetin (2018) concluded that strategies used in reading comprehension were more successful in comparison with traditional teaching techniques, in light of the results of studies on the topic synthesized using the meta-synthesis method. Although there are a wide variety of reading comprehension strategies, digital-based applications come to the forefront due to their suitability for today's conditions called "the digital age". One of these applications is digital storytelling.

In today's era, where digital technologies are deeply integrated into our lives, early interaction of children with these technologies is critically important for meeting the requirements of the contemporary world and supporting their academic future. In this context, it is essential to integrate digital materials with basic reading comprehension skills, necessary for students' academic success, at an early age. For this reason, while the Ministry of National Education (MEB, 2019) encourages the inclusion of these technologies in the curriculum, the European Union aims to contribute to the development of digital generations through digital storytelling within the framework of the STORIES Project. This study designed in the context of this project aims to examine the effects of digital storytelling on the reading comprehension skills of second-grade primary school students in Turkish course.

In today's world where digital technologies have given their name to our age, the effects of these technologies can also be observed in education and training (Sarigöz et al., 2018). Within the framework of these effects, the Ministry of National Education emphasizes the effective use of technological tools such as computers, the Internet, and interactive whiteboards in the teaching-learning process (MEB, 2019). In this regard, one of the materials used to support students' reading comprehension skills is digital stories (Demirkol & Girmen, 2023: 35). According to Jakes and Brennan (2005), digital stories created using web 2.0 tools include the process of writing a story, while at the same time creating a visual story by adding multimedia elements such as sound, visuals, and music to this story (Türkben & Alptekin, 2023: 912). Digital stories, which can be defined as short videos, products, or films resulting from the integration of a range of multimedia tools such as music, sound (Şahin & Yavaş, 2022), images, and video with a narrative, enhance the progress of students' critical thinking and reading comprehension skills (Aydın & Erol, 2021; Dönger et al., 2016). There is also a very large literature in this direction. However, studies examining the effects of digital materials on reading comprehension skills, especially in young students, in comparison with current instruction are partially limited. Hence, this research, aimed at investigating the influence of digital stories on reading comprehension in the second-grade Turkish course, is anticipated to make a valuable contribution to the existing literature.

METHOD

Research Method and Design

A quasi-experimental model was applied in this study. It is a methodology employed to determine the causal connections between the variables being studied (Aydoğdu et al., 2017). Quasi-experimental studies are utilized in situations where the sample cannot be randomly selected from the entire population, where both control and experimental groups are present, and where an experimental intervention is applied (Yıldırım & Şimşek, 2008). The symbolic representation of the study's quasi-experimental design, which includes pre-test and post-test control groups, is illustrated below (Karasar, 2017).

Y	G _C	O _{1.1}	X	O _{1.2}
Y	G _E	O _{2.1}	----	O _{2.2}

Symbols in the research design: Y: Unbiased Assignment, G_E: Experimental Group, G_C: Control Group, X: Experimental procedure (Digital Storytelling), O: Score obtained on the dependent variable.

Figure 1. Symbolic View of the Quasi-Experimental Method

Population and Sample

The study's population consists of a total of 320 second-grade students enrolled at İffet-Zübeyr Göçmen Primary School in the city center of Hatay during the 2022-2023 academic term. The sample group, on the other hand, comprises a total of 70 second-grade students from the 2-A and 2-B classes of the same school, which are considered equivalent. Among these students, 35 were allocated to the control group and 35 to the experimental group through an unbiased assignment process. The following conditions were considered in the assignment of students to both the control and experimental groups (Baysan & Uluyol, 2016).

- Students are equal to each other in terms of their academic achievement in Turkish lessons,
- These students received equivalent scores in the 'Reading Comprehension Scale (RCS)' pre-test application,
- They are also similar to each other in terms of socio-economic and gender variables.

The demographic distribution of the students constituting the study group is given below:

Table 1. Distribution of the Students Constituting the Study Group According to Gender

Groups	Female		Male		Total
	<i>n</i>	%	<i>n</i>	%	
<i>Control</i>	21	60.00	14	40.00	35
<i>Experimental</i>	16	45.72	19	54.28	35

Table 2. Socio-Economic Demographic Distribution of the Students in the Study Group

Monthly Income	Experimental		Control		Fathers' Educational Background	Experimental		Control		Mothers' Educational Background	Experimental		Control	
	<i>n</i>	%	<i>n</i>	%		<i>n</i>	%	<i>n</i>	%		<i>n</i>	%	<i>n</i>	%
Weak	9	25.71	7	20.00	Primary School	8	22.85	11	31.42	Primary School	17	48.57	15	42.85
Middle	11	31.42	13	37.14	Middle School	7	20.00	5	14.28	Middle School	8	22.85	10	28.57
Good	9	25.71	10	28.57	High School	14	40.00	15	42.85	High School	5	14.28	4	11.42
Very good	6	17.14	5	14.28	University	6	17.14	4	11.42	University	5	14.28	6	17.14
Total	35	100	35	100	Total	35	100	35	100	Total	35	100	35	100

An analysis of table 1 and table 2 reveals that both the experimental group and control group students are similar with respect to gender and socio-economic variables. This is very important for quasi-experimental research.

Data Collection Process

The research was conducted in the Turkish language lessons attended by students from the sample classes during the second semester of the 2022-2023 academic year. The scale used as a data collection tool was applied as a pre-test to all students prior to the experimental intervention, after which the lessons commenced. Following the experimental intervention, the same scale was applied as a post-test to students in both the control and experimental groups. Enough time was allocated for both applications of the scale.

Data Analysis Process

A normality test was used to determine whether the data obtained in the research followed a normal distribution. An independent samples t-test was employed to compare the pre-test scores of the control and experimental groups before the experimental process. Similarly, an independent samples t-test was used to compare the post-test scores of the control and experimental groups after the experimental process. To compare the pre-test and post-test scores within each group (control and experimental), a paired samples t-test was conducted.

Experimental Process

During the experimental phase of the study, the control group followed the standard instruction alone, while the experimental group received instruction supplemented with digital storytelling in addition to the standard instruction. Prior to the experimental process, 'the Reading Comprehension Scale (RCS)' was conducted on both groups as a pre-test in order to make matching. Table 3 presents the outcomes of this test.

Table 3. Results of the Independent Samples t-test for the Pre-test Scores of the Control and Experimental Groups

RCS	Groups	<i>n</i>	\bar{x}	<i>sd</i>	<i>df</i>	<i>t</i>	<i>p</i>
<i>Pre-test</i>	Control	35	10.07	5.17	68	0.913	0.154
	Experimental	35	11.04	5.56			

* $p > .05$

An examination of table 3 reveals that, prior to the initiation of the experimental procedure, there is no statistically significant variation between the pre-test mean scores of the control and experimental group students on the reading comprehension scale [($t(68) = .913$; $p > .05$)]. This finding is important for the matching of groups before the experimental procedure, which is also critical for quasi-experimental research. The absence of a meaningful variation in the pre-test scores of the RCS between the two groups prior to the experimental procedure indicates that the groups are comparable in terms of reading comprehension. Furthermore, the data given in table 1 and table 2 illustrate the demographic similarities between the two groups before the implementation of the experimental procedure.

After establishing the similarity between the students in both groups, the control group received instruction using the existing teaching method with written texts. The control group students were also asked comprehension questions about the texts they read. In the same period, the experimental group received instruction using digital storytelling with DHV support over a period of five weeks. The digital storytelling videos used in this process are created with iMovie, Slide.ly, Powtoon, Animoto, Storyjumper, Tellagami, and Moovly programs. These videos, which included reading and writing activities and were suitable for second-grade primary students, were presented to the students via tablets/smart boards. Following the viewing of these videos, questions related to the stories were posed to ensure the students' comprehension of the content.

At the end of the five-week experimental procedure, the 'Reading Comprehension Scale' was re-administered to both groups as a post-test. The data for this study were gathered through the use of an 'Information Form' and a 'Reading Comprehension Scale,' both of which were developed by the researchers. The information form consists of four demographic questions. The second data collection instrument, the 'Reading Comprehension Scale,' includes a checklist for evaluating 'reading comprehension' of the digital/written texts viewed/read by the control and experimental group students, as well as the scoring of this checklist. Teachers evaluated the students' answers to the questions regarding the texts they had viewed/read at the end of each lesson according to the criteria specified in the checklist. These criteria include identifying the main idea, filling in missing parts appropriately, establishing text-image relationships, finding homophones, identifying synonyms/antonyms, summarizing, and finding an appropriate title.

In the evaluation of the average scores achieved by students in both the groups on the 'Reading Comprehension Scale,' homogeneity tests were performed to examine the distribution of both the pre-test and post-test scores to determine whether the data exhibited a normal (parametric) distribution (see tables 4 and 5).

Table 4. Normality Distribution of the Pre-test Scores for the Groups

RCS	Group	Skewness Coefficient	Kurtosis Coefficient	S-W	p
<i>Pre-test</i>	Control	.347	-.679	.954	.219
	Experimental	.427	-.195	.980	.062

*p>.05

Upon examining table 4, it can be observed that the pre-test scores for the RCS of both the control group (S-W=0.954, p=0.219 > 0.05) and the experimental group (S-W=0.980, p=0.062 > 0.05) follow a normal distribution.

Table 5. Normality Distribution of the Post-test Scores for the Groups

RCS	Group	Skewness Coefficient	Kurtosis Coefficient	S-W	p
<i>Post-test</i>	Control	.418	-.295	.918	.909
	Experimental	.337	-.127	.889	.059

*p>.05

Upon examining table 5, it can be observed that the post-test scores on the Reading Comprehension Status Checklist for both the control group (S-W=0.954, p=0.219>0.05) and the experimental group (S-W = 0.980, p=0.062 > 0.05) follow a normal distribution. Given that both the pre-test and post-test score distributions are normal; it was decided to use parametric statistical techniques for their analysis.

Based on these results, independent samples t-tests were employed for pairwise group comparisons, while paired samples t-tests were used for comparing pre-test and post-test scores within the same group. The effect size of significant differences between group mean scores was interpreted using Eta squared (η^2). The range for η^2 was considered as follows: '0.01 - small effect, 0.06 - medium effect, 0.14 - large effect' (Özsoy & Özsoy, 2013).

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FINDINGS

Findings Related to the Comparison of Pre-Test and Post-Test Scores of the Control Group

The results of the paired-samples t-test, conducted to evaluate the difference between the pre-test and post-test mean scores of students in the control group are presented in table 6.

Table 6. Results of Paired Samples t-test for the Control Group's Pre-test and Post-test Scores

RCS (Control)	<i>n</i>	\bar{x}	<i>sd</i>	<i>df</i>	<i>t</i>	<i>p</i>	η^2
<i>Pre-test</i>	35	10.07	3.11	34	2.118*	.042	.021
<i>Post-test</i>	35	15.97	4.01				

* $p < .05$

An examination of table 6 reveals that the post-test scores of the control group students, who were taught based on the existing curriculum, are statistically higher than their pre-test scores. This finding suggests that the activities implemented during the experimental process had a positive impact on the reading comprehension skills of the control group students.

Findings Regarding the Comparison of Pre-Test and Post-Test Scores for the Experimental Group

In the context of the study, table 7 displays the results of the paired samples t-test conducted to evaluate the difference between the pre-test and post-test mean scores of the experimental group students who received instruction supported by digital storytelling videos.

Table 7. Results of the Paired Samples t-test for the Pre-test and Post-test Scores on the Reading Comprehension Scale for the Experimental Group

RCS (Experimental)	<i>n</i>	\bar{x}	<i>sd</i>	<i>df</i>	<i>t</i>	<i>p</i>	η^2
<i>Pre-test</i>	35	11.04	3.18	34	3.987*	.029	.028
<i>Post-test</i>	35	19.36	3.95				

* $p < .05$

An analysis of table 7 reveals that the improvements in reading comprehension among the experimental group students, who were taught using digital storytelling videos, have shifted in favour of the post-test scores over the course of the experimental process.

Findings Regarding Comparison of Post-Test Scores of Control and Experimental Groups

The results of the independent samples t-test conducted to compare the post-test mean scores on the Reading Comprehension Scale between the control group students, taught using the existing curriculum and textbook,

and the experimental group students, whose lessons were supported by digital storytelling videos, are presented in Table 8.

Table 8. Results of the Independent Samples t-Test for the Comparison of Post-Test Scores of the Control and Experimental Groups

RCS	Groups	n	\bar{x}	sd	df	t	p	η^2
Post-test	Control	35	15.97	4.15	68	2.587*	.032	.059
	Experimental	35	19.36	5.53				

* $p < .05$ (medium effect size)

Table 8 shows that the control group, where lessons were conducted based on the existing curriculum and course book, had a mean post-test score of 15.97 out of 25, while the experimental group, where lessons were supported by digital storytelling videos, had a mean post-test score of 19.36 out of a maximum possible score of 25. The independent samples t-test results revealed a statistically significant disparity between the two groups ($t(68) = 2.587$; $p < .05$). This significant difference was found to be of medium effect size.

CONCLUSION and DISCUSSION

At the end of the 5-week experimental research process, there was an increase in the scores of both the experimental group and the control group in the reading comprehension skills test. Independent groups t-test analysis was performed to compare the increases in these scores of the groups. The results of this test showed that the increase in reading comprehension skills of the students in the experimental group where digital storytelling was used was higher than the increase in reading comprehension skills of the students in the control group where courses were conducted based on the current curriculum. This suggests that digital storytelling contributes to the reading comprehension skills of second-grade primary school students. Ciğerci (2015) made a research to determine the effect of digital stories on the listening comprehension skills in the fourth-grade Turkish course in primary school. The results of his study stated that "Introducing listening activities based on digital stories in the fourth-grade Turkish course improved the students' listening comprehension skills", are also consistent with the results of this study. Kandemir and Bay (2023) conducted a study to determine the effect of the use of digital storytelling on the reading comprehension skills of 4th grade primary school students. The results of their study are also consistent with the results of this research. There are also studies in the literature that are not compatible with the results of this research. Çiftçi (2019) conducted research on the same subject, concluded that digital stories had no effect on the reading skills of primary school 2nd grade students. Batluralkız (2018) also determined that there was no significant difference between the reading comprehension success of secondary school 6th grade students on screen and paper. Studies on the effects of digital stories on reading comprehension have yielded different results. This situation shows that there are various factors that can affect the effect of digital storytelling. The effect of digital story materials on primary school students' reading comprehension skills may vary depending on a number of factors such as the quality of the material used, teacher and student attitudes, and family factors. According to (Çelenk, 2003) parents have a great influence on the interest and attitudes of children in this age group towards digital materials. Therefore, communication with families is absolutely necessary in innovations such

as the use of digital materials. Similarly, the opinions of students, teachers, and parents should be taken into account when designing new educational materials. In addition, another reason why the effect of digital story materials may be limited may be that students do not have the ability to use these materials effectively. At this point, Çetin and Demir (2021) recommend strategies such as highlighting, rereading, using a digital dictionary, and effective web use to contribute to the reading comprehension skills of digital materials. In addition to these suggestions, the fact that students who grew up with digital technologies are familiar with these technologies and that digital stories are one of the learning methods of this generation and age group suggests that there are other reasons for the limited effect of digital story materials. To determine these possible reasons, the reasons why digital story materials cannot contribute sufficiently to the education of students in this age group should be analysed in detail.

Technologically well-crafted digital storytelling, designed in alignment with course content, social culture, psychology, and educational principles are of great importance for the personal development, digital life skills acquisition, and academic success of primary school second-grade students (Dede, 2019).

For this reason, digital storytelling that aim to support primary school students' reading comprehension skills should be designed to have a game-based structure in which children will actively participate (Ertem, 2016). In our age where digital technologies affect every aspect of life, digital educational materials offer various advantages compared to traditional printed textbooks. However, in order to fully benefit from these advantages, it is important that the sound, animation, music, video and various sound effects (Aşkın, 2016) in digital storytelling are designed in accordance with the characteristics of this age group and generation, the content of the relevant course and the needs of society. In the words of Robin (2009), digital stories should be informative, educational, motivating, demonstrative and include the narration of real or fictional personal experiences depending on the integrity of the subject.

Another finding from the research is a notable difference favouring the post-test scores compared to the pre-test and post-test scores among the control group students, who were provided with instruction through traditional methods over a span of five weeks. This indicates that traditional teaching methods also contribute to the reading comprehension skills of second-grade students. Aside from some implementation issues, the current teaching methods in primary schools in our country represent a contemporary approach based on progressive education, constructivism, and learner-centred principles (Teyfur & Teyfur, 2012). However, the contribution of these existing teaching methods is more limited compared to the results performed by the experimental group students, who were taught with digital storytelling. This suggests that digital storytelling have a more significant impact on second-grade students' reading comprehension skills compared to traditional teaching methods. Indeed, the findings of relevant studies (Duran & Özen, 2018; Gezer, 2020; Karaoğlu, 2021) substantiate this conclusion.

SUGGESTIONS

The research concluded that digital materials support second-grade students' reading comprehension skills, and this contribution, supported by the literature, is critically important for academic and life success. Reading comprehension, defined as the ability to interpret written or visual symbols (Özbay, 2014), serves not only as a tool for acquiring knowledge but also as the key to lifelong learning (Balçı, 2013). Therefore, digital-material-supported reading comprehension activities should be an integral part of educational programs for academic success and meaningful life purposes (Akyol, 2014). In the information age, if the goal is to obtain "knowledge" (Cemiloğlu, 2009), achieving this goal depends on effective reading comprehension skills. In this context, reading comprehension should encompass not only understanding texts or screens but also analyzing both analog and digital messages rapidly and critically (Damar, 1996).

Additionally, in today's rapidly changing teaching technologies, it is essential for teachers to adapt. Therefore, teacher candidates and in-service teachers should be trained in the preparation, implementation, and evaluation of digital stories. Such content should be incorporated into teacher training policies and in-service training programmers.

Furthermore, the role of family support, which constitutes an important dimension of education, should also be considered in this context. Nowadays, students have increased opportunities to engage with digital technologies outside of school hours. Parents should be guided on how to direct students towards accessing digital content that could benefit their schoolwork during these times.

Considering the potential of digital stories to enhance students' academic achievements, technical environments for creating and narrating digital stories should be established in schools. Accessibility to digital tools and software in schools should be increased to ensure their effective use by both teachers and students.

In the curriculum development process, digital storytelling tools and methods should be included in curricula to facilitate the learning and application of digital storytelling by teachers and students.

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Idea or Notion	1st Author 50 %, 2nd Author 50 %
Literature Review	1st Author 50 %, 2nd Author 50 %
Method	1st Author 50 %, 2nd Author 50 %
Data Collecting	1st Author 50 %, 2nd Author 50 %
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