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Using Technology to Support Creative Writing: How It Affects Teachers' Digital Writing Skills and Their Gains from Digital Technology

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ABSTRACT

With the advances in technology, the skill of writing has taken on a new form with digital tools. Concepts like digital literacy, digital writing, electronic writing, web-based writing, online writing, and multimodal texts have become increasingly common. Hence, integrating technology into writing education in schools today has gained significance. This way, students can write digitally and produce digital texts in harmony with their lives outside of school. Teaching these skills to students is only possible to the extent of the teachers' digital writing skills, digital writing habits, self-efficacy in using technology, self-efficacy in preparing digital teaching materials, and improvement of these skills. In this context, the current research aims to investigate the effects of web-based creative writing practices on teachers' digital writing skills, digital writing habits, self-efficacy regarding digital education technology standards, and self-efficacy in developing digital teaching materials. For this purpose, we used the experimental method "one-group pretest-posttest design." The data were collected from a total of 40 teachers: 20 classroom teachers and 20 Turkish language teachers. We carried out 16 creative writing activities where the participants performed digital writing. In seven of these activities, the participants received information and observed examples of digital tools that can be used in writing education or created texts using various digital tools, like tools for creating digital stories and cartoons. For data collection, we used certain data collection tools before and after the writing activities. We analyzed the data using the Kolmogorov-Smirnov Test, the paired samples t-test, and the Wilcoxon signed-rank test via the SPSS 20.0 software. We interpreted the data and presented it in tables. We concluded that web-assisted creative writing practices had positive effects on teachers' digital writing skills, digital writing habits, self-efficacy regarding digital education technology standards, and self-efficacy in developing digital teaching materials.

Keywords:
Creative writing, digital writing, digital technology

1. Introduction

The 21st century has brought numerous new skills. Literacy, communication, collaboration, learning to learn, critical thinking, and digital and technological competencies have become necessary skills for every individual in this century. According to Afrilyasanti and Basthomi (2011), it has become a necessity for students to meet these 21st-century skills for their own survival and improvement. One of the skills that students today need to acquire is creative thinking. Creative thinking is the ability to produce new syntheses from existing knowledge through inventive, innovative, and original thoughts, to produce different solutions to problems, to think outside the box about the functions of objects, and to adapt to new situations easily (Bayındır, 2013; Üstündağ, 2014; Yenilmez & Yolcu, 2007). One of the areas that uses creative thinking the most is creative

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writing. Creative writing practices can contribute to students' imaginations and improve their creativity (Memiş, Sever, & Bozkurt, 2016; Susar Kırmızı, 2009).

Creative writing first emerged as a modern subject in educational settings some time at the end of the 19th century and at the beginning of the 20th century (Kroll, 2003). Creative writing is a new activity that involves reconstructing and associating the existing knowledge, concepts, events, sounds, images, and dreams. It allows one to freely transfer their feelings and thoughts on a subject to paper using their imagination (Demir, 2013). Creative writing is based on establishing different and fluent relationships between numerous thoughts and dreams (Temizkan, 2010). Creative writing involves reorganizing the known sounds, knowledge, events, concepts, images, and imaginations in a certain order and creating an aesthetic and literary product that eventually reveals their relationship with each other (a story, poetry, etc.) (Güleryüz, 2006).

The concept of creative writing suggests that it emerges as an innate talent or as a source of inspiration. However, Smith (2020) argues that creative writing can be handled systematically and analytically and developed with various strategies, which form the basis of creativity. Hence, creative writing is not a skill limited to talent; it is directly correlated with one's interest, effort, and education in this context. In fact, Simonton (2004) defines a creative writer as "a creative person: someone who applies logic, a method, or a set of techniques to a particular area of expertise." This indicates the significance of writing education in the acquisition and development of creativity and creative writing skills. Giving importance to writing education and performing creative writing activities improves creativity and writing skills. Also, creative writing practices have numerous positive effects on students. Research shows that creative writing practices positively affect Turkish language lessons and improve students' writing attitudes, writing and creative writing success, self-efficacy, and perceptions of self-efficacy in writing (Ak, 2011; Bircan Manay, 2017; Demir, 2011; İşeri & Ünal, 2012; Korkmaz, 2015; Melanlıoğlu & Atalay, 2016; Memiş, Sever, & Bozkurt, 2016; Özdemir & Çevik, 2018; Öztürk, 2007; Susar Kırmızı, 2009; Susar Kırmızı, 2015; Şahin, 2019; Temizkan, 2011).

In the age of technology, the skill of writing has taken a new form with digital tools. Concepts like digital literacy, digital writing, electronic writing, web-based writing, online writing, and multimodal texts have become increasingly common. According to Baki (2019), today's writing skills must overlap and combine with technological knowledge. This indicates the importance of integrating digital technologies into creative writing education. Digital literacy is defined as ability to create new information and media expressions, and to access digital resources as well as managing, integrating, evaluating, analyzing and synthesizing these resources in order to use digital tools appropriately; the awareness, attitude and ability of using resources, tools and opportunities with the purpose of cooperating and communicating with others; and the ability to understand how and when digital technologies can best be used to support these processes (Hague & Payton, 2010; Martin, 2005). Digital writing has emerged as a component of digital literacy. It is a form of communication that is performed with symbols using technological resources and is sometimes linked to a web network where it can be presented (Susar Kırmızı, Kapıkıran, & Akkaya, 2021). As the act of creating a text using a device that is connected to the Internet (DeVoss, Eidman-Aadahl, & Hicks, 2010), digital writing covers other concepts like electronic writing, web-based writing, or online writing. Today, creative writing education should be carried out in a way that provides opportunities for students to perform digital writing.

Providing students with the opportunity to perform digital writing also helps them gain some other crucial skills: collaborating and interacting in digital environments, writing, and publishing online, writing for actual readers, and getting feedback from actual readers (Göcen, 2021). Besides, research shows that digital writing positively affects writing skills, writing success, writing perception, writing attitude, interest in writing, willingness to write, self-efficacy in writing, and writing quality (Alshumaimeri, 2011; Cheung, 2016; Choo & Li, 2017; Duwila & Khusaini, 2019; Nobles & Paganucci, 2015; Pruden, Kerkhoff, Spires, & Lester, 2017; Relles & Tierney, 2013; Yunus, Nordin, Salehi, Embi, & Salehi, 2013).

There are some studies in the literature that including web tools in Turkish language lessons, writing education, and creative writing education has positive effects on students. Studies in the literature have examined the effects of web tools on writing and creative writing skills (Aktas & Akyol, 2020; Aydın, 2019; Baki, 2019; Baş & Turhan, 2017; Benzer & Karadağ, 2019; Çangal, 2020; Demir & Kılıçkıran, 2018; Demirbaş, 2019; Demirer & Baki, 2018; Ertan-Özen & Duran, 2021; Eskimen & Erdoğdu, 2020; Gücüyeter & İskender, 2019; Gündüzalp, 2021; Karadağ & Garip, 2021; Karakuş, Türkkan, & Namlı, 2020; Mete & Batıbay, 2019). Still,

the impact of web-supported creative writing education on students' digital writing skills and habits has yet to be investigated. In this context, we think more studies are needed to examine the effect of web-supported creative writing activities on participants' digital writing abilities and habits.

The relevant studies in the literature mostly focus on primary and secondary school students and teacher candidates. According to Konuk (2021), research on the effects of creative writing on primary and secondary school students has reached a certain level of saturation. Note that the development of students is heavily based on the skills their teachers have acquired. A teacher who has acquired the skills and habits for writing, creative writing, digital writing, and who can use web tools can teach these skills to their students efficiently. Researchers emphasize the significance of teachers' experiences with writing and creative writing practices (Maltepe, 2006; Temizkan & Yalçınkaya, 2013; Yıldız, Okur, Arı, & Yılmaz, 2008). There are studies, albeit a few, on the effects of creative writing practices on primary school teachers' writing skills, writing attitude, and writing motivation (Göçen, 2018a; Göçen, 2018b; Göçen, 2018c) and on the effects of digital story practices on classroom teachers' attitudes towards computer-assisted education (Göçen Kabaran, Karalar, Aslan Altan, & Altıntaş, 2019). However, there is no research that enriches creative writing practices with web tools and explores the impact of these practices on teachers' digital writing skills and habits. Hence, it is important to investigate the effect of web-supported creative writing activities on teachers' digital writing skills and habits.

Studying the effects of web-based creative writing practices on teachers' digital writing skills and habits and organizing training for teachers in this regard can help improve their skills and self-efficacy in using technology. This way, teachers can perform writing practices using different digital tools and experience digital writing. Only teachers who have this experience can transfer their experiences to their students. As argued by Akbaba and Erbaş (2019), such practices require teachers to be technologically literate and be able to use their knowledge of technology effectively and harmoniously in classroom practices. Teachers who use web tools in creative writing education can also transfer these skills to other fields of education. This can support teachers' use and production of digital teaching materials in educational environments. Teachers who perform writing practices with different web tools can also employ the same tools for other subjects or search for other web tools that they can use in this regard. Teachers who have the self-efficacy and ability to use technology and web tools can produce different digital materials related to their subjects.

Given the importance, needs, requirements, and expectations associated with creative writing, this research was based on the following question: "How do web-supported creative writing activities affect teachers?" Therefore, we aimed to investigate the effects of web-assisted creative writing activities on teachers' digital writing skills, digital writing habits, self-efficacy regarding digital education technology standards, and self-efficacy in developing digital teaching materials. Hence, *(i)* How do web-assisted creative writing practices affect teachers' digital writing skills? *(ii)* How do web-assisted creative writing practices affect teachers' digital writing habits? *(iii)* How do web-assisted creative writing practices affect teachers' self-efficacy regarding digital education technology standards? *(iv)* How do web-assisted creative writing practices affect teachers' self-efficacy in developing digital teaching materials? we sought answers to research questions.

The present research is one of the few studies in this field to investigate the impact of web-assisted creative writing on teachers, not students. Besides, this research handles web-supported creative writing practices, thus differing from relevant previous studies. Moreover, this is the first study to investigate the effect of web-based creative writing on digital writing skills and habits. Furthermore, this research is the first to question the impact of web-assisted creative writing on teachers' self-efficacy regarding digital education technology standards and their self-efficacy in developing digital teaching materials.

2. Methodology

2.1. Research Design

We used the experimental method of "one-group pretest-posttest design." This design involves making measurements both before (pretest) and after (posttest) the experiment (Karasar, 2000). This design was considered the most appropriate because we investigated the effects of web-assisted creative writing practices on teachers' digital writing skills, digital writing habits, self-efficacy regarding digital education technology standards, and self-efficacy in developing digital teaching materials. Table 1 below shows the research design.

Table 1. *Research Design*

Pretest	Experiment	Posttest
O1 1. Digital Writing Scale 2. Electronic Writing Habits Scale 3. Self-Efficacy Scale for Educational Technology Standards 4. Self-Efficacy Scale for Developing Digital Teaching Materials	Web-based creative writing practices	O2 Digital Writing Scale 2. Electronic Writing Habits Scale 3. Self-Efficacy Scale for Educational Technology Standards 4. Self-Efficacy Scale for Developing Digital Teaching Materials

2. 2. Research Sample

This research was carried out under the TUBITAK 4004 Nature Education and Science Schools Support Program (Project No: 121B747). The research population included classroom teachers and Turkish language teachers. The research sample consisted of 40 teachers: 20 classroom teachers and 20 Turkish language teachers. The reason classroom teachers and Turkish teachers were chosen in the study is that "writing education" is started at the primary school level through classroom teachers and "writing skills" are developed at the secondary school level through Turkish teachers.

In the selection of the sample, the "criteria sampling" method, one of the "purposive sampling" methods, was used. "Purposive sampling" "allows for in-depth research by selecting information-rich situations depending on the purpose of the study." (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz, & Demirel, 2016). The sample was selected among primary school teachers and Turkish teachers considering certain criteria. The sample was determined as follows:

Applications for participation in the project were received through the "Participant Form" on the project's website. 930 teachers applied to the project. The project was carried out in a public school in a district of a province in the Marmara Region and lasted for one week. We first determined some exclusion criteria to reduce the number of applications. The exclusion criteria are set as follows: *(i)* Those who are not vaccinated against COVID-19, *(ii)* Those who are not actively teaching, *(iii)* Those who will teach 1st-grade students in the fall semester of 2021-2022, *(iv)* Those who are not classroom teachers or Turkish language teachers, *(v)* Those who apply with the purpose of becoming a writer or publishing a book, *(vi)* Those who had spelling and punctuation errors in the project application form, *(vii)* Those who previously participated in projects, courses, etc. about creative writing, *(viii)* Those who have developed themselves in creative writing and have done similar exercises in their classes.

We took the following into account when selecting the participants: *(i)* The participants represent each of the 7 regions in Turkey, *(ii)* The participants consist of 20 classroom teachers and 20 Turkish language teachers, *(iii)* The participants consist of 20 women and 20 men, *(iv)* The participants work in different cities, *(v)* The participants have not participated in a similar TUBITAK project previously, *(vi)* The participants have not participated in a similar project, course, etc. previously, *(vii)* The participants do not know the methods of creative writing and techniques, and do not apply similar practices in their classes, *(viii)* The participants need creative writing activities.

Given the above criteria, our sample is composed of 40 classroom and Turkish language teachers. However, some of the participants withdrew from the project, some even one day before the start date. We invited participants from the nearest regions to replace these participants. This way, the final version of the participant list emerged. Accordingly: *(i)* 20 participants are classroom teachers, and 20 are Turkish language teachers. *(ii)* 20 participants are men, and 20 are women. *(iii)* The participants cover the 7 regions of Turkey: 12 participants work in Marmara, 5 in Central Anatolia, 2 in the Mediterranean, 4 in Southeast Anatolia, 6 in Aegean, 3 in Eastern Anatolia, and 8 in the Black Sea. *(iv)* The participants work in 30 different cities: Afyonkarahisar (1), Ankara (2), Aydın (1), Bingöl (1), Burdur (1), Bursa (2), Çanakkale (1), Çorum (1), Denizli (1), Diyarbakır (1), Düzce (2), Erzurum (1), İstanbul (3), İzmir (2), Karabük (1), Kastamonu (1), Kocaeli (2), Konya (1), Kütahya (1), Mardin (1), Mersin (1), Nevşehir (1), Niğde (1), Ordu (1), Sakarya (4), Samsun (1), Şanlıurfa (1), Siirt (1), Van (1), Zonguldak (1).

In this context, the data for the current study was obtained from 40 teachers. The participants were randomly selected among those who volunteered to participate in the project and met the specified criteria.

2.3. Data Collection Tools and Procedure

The research began as the selected participants arrived in Sapanca, Sakarya for the project between September 6 and 11, 2021. We collected the data through the implementation of creative writing activities in a development center designated for the project on the specified dates.

Data collection began with the pretest application of the data collection tools selected for the research. Then, the activities in line with our aims were carried out within the specified period. Finally, data collection ended with the posttest application of the data collection tools.

The project included 16 creative writing activities. In these activities, teachers wrote their texts digitally on the computer, with or without a web tool. Of all the activities, 7 web-supported creative writing activities, some theoretical and some practical, were carried out. Besides digital writing on the computer, these seven activities involved the use of various teaching technologies. Table 2 shows information about these activities:

Table 2. *Data Collection*

Applying Pretest				
Performing Activities				
Activity Name	Date	Type	Tool	Aim
Acquiring Writing Skills	07.09.2021	Theoretical	-	To explain the importance of teaching writing skills and the necessity of using technology in this teaching.
The World's Most Beautiful Color	08.09.2021	Practical	Padlet, Google, Documents	To benefit from educational technologies when teaching writing skills and digitally creating wall writings in an interactive way using a mobile application (Padlet). To write creative letters using a digital collaboration tool (Google Docs) in groups based on the wall writings.
Integrating Writing Skills and Digital Tools into Writing Education	08.09.2021	Theoretical and Practical	Mentimeter, Coggle, Wordwall, GoogleDocs, Powtoon, Canva Toonytool, Padlet, Storyjumper, SocialMedia , Blogger	Giving information and showing examples about which educational technologies to use when improving students' writing skills. To experience the tools that increase interaction in learning environments.
I'm a Superhero	09.09.2021	Practical	Class Tools	To use digital tools when improving students' writing skills and designing a creative social media page using digital software (Class Tools).
Wordmatic	10.09.2021	Practical	Wordwall	To play a word game, write the words on a wheel, and write a poem with 5 randomly selected words.
Talking Lines	10.09.2021	Practical	ToonyTool	To use digital tools when improving students' writing skills and to produce a creative story text with cartoons using digital cartoon software (ToonyTool).
My Life Is a Novel	11.09.2021	Practical	photoStor3	To use digital tools when improving students' writing skills and to transform their autobiographies into digital stories by adding visuals, music, effects, and voiceovers using digital storytelling software (photoStory3).
Applying Posttest				

In the theoretical web-assisted creative writing activity, the participants received theoretical information about Blogger (blog page maker), Canva (banner and brochure maker), Coggle (concept map maker), Powtoon (animation maker), Social Media, and Storyjumper (digital story maker), and observed examples of writing activities.

In the practical web-supported creative writing activities, the participants received theoretical information about Tools (a digital profile maker), Google Docs (an online collaborative writing tool), Mentimeter (a poll and word cloud maker), Padlet (a digital bulletin board maker), photoStory3 (a digital story maker), Toonytool (a cartoon maker), and Wordwall (a word wheel maker), observed examples of writing activities, and used these tools themselves in creative writing practices.

2.4. Data Collection Tools

For data collection, we used up-to-date, reliable, and validated scales. We obtained permission from the relevant researchers for each scale.

The Digital Writing Scale developed by Atabek (2020) was used to determine whether web-supported creative writing practices affected teachers' digital writing skills. The scale consists of the subscales of digital transformation and digital review. The scale has a Cronbach's Alpha value of 0.89 and explains 54.51% of the total variance.

The Electronic Writing Habits Scale was used to investigate whether web-supported creative writing practices affected teachers' digital writing habits. This scale was developed by Maden, Banaz, and Maden (2018) to determine the digital writing habits of Turkish language teacher candidates. The scale consists of three subscales: psychology (interest or attitude), purpose, and daily use. The scale has a Cronbach's Alpha value of 0.86 and explains 65.70% of the total variance.

The Self-Efficacy Scale for Educational Technology Standards developed by Şimşek and Yazar (2016) was used to determine teachers' self-efficacy regarding educational technology standards. The scale has five subscales: facilitating learning and encouraging creativity; designing and developing learning environments and evaluation activities suitable for the digital age; leading the learning approach of the digital age; setting an example for digital citizenship; and participating in professional development and leadership activities. The scale has a Cronbach's Alpha value of 0.95.

Finally, we used the *Self-Efficacy Scale* for Developing Digital Teaching Materials developed by Korkmaz, Arıkaya, and Altıntaş (2019) to measure teachers' self-efficacy in developing digital teaching materials. The scale consists of 3 subscales: web 2.0 development, design, and negative perspective. The scale has a Cronbach's Alpha value of 0.96 and explains 62% of the total variance.

2.5. Data Analysis

The SPSS 20.0 software was used for the data analysis. We used the Kolmogorov-Smirnov Test to compare the teachers' pretest and posttest scores regarding digital writing skills, digital writing habits, self-efficacy regarding digital education technology standards, and self-efficacy in developing digital teaching materials.

The total scores for digital writing skills showed a normal distribution ($p>0.05$), so we used the paired samples t-test to analyze the total scale scores. The subscale scores did not show a normal distribution ($p<0.05$), so we used the Wilcoxon signed-rank test to analyze the subscale scores.

The scores for digital writing habits showed a normal distribution ($p>0.05$). For this reason, we used the paired samples t-test to analyze the scale scores. The total scores for self-efficacy regarding digital education technology standards showed a normal distribution ($p>0.05$), so we used the paired samples t-test to analyze the total scale scores. The subscale scores did not show a normal distribution ($p<0.05$), and because of this, we used the Wilcoxon signed-rank test to analyze the subscale scores. The scores for self-efficacy in developing digital teaching materials showed a normal distribution ($p>0.05$), so we used the paired samples t-test to analyze the scale scores.

2.6. Ethical Considerations for Research and Publication

During the conduct of this research, we followed all the rules specified in the Scientific Research and Publication Ethics Directive by the Higher Education Institutions. Also, none of the actions specified in Article 2 of the Directive, titled Actions Contrary to Scientific Research and Publication Ethics, occurred. We obtained an ethics committee report before conducting this research (Institution = Ethics Committee at Fatih Sultan Mehmet Foundation University, Decision date = 14/12/2020, Document number = 51).

3. Findings

In the study, in order to compare the pretest and posttest scores of teachers regarding digital writing skills, the Related Samples t-Test was used in the analysis of the scale total scores, since the data showed normal distribution (p>0.05) according to the Kolmogorov-Smirnov Test results. Table 3 below shows the results of the analysis.

Table 3. *Paired Samples T-Test Results Regarding Teachers' Pretest and Posttest Scores for Digital Writing Skills*

Measurement	N	$\underline{X}$	S	sd	t	*p*
Pretest	40	63,97	5,47	39	-4,35	0,000
Posttest	40	68,05	3,55			

There was a significant difference between the mean pretest scores ($\underline{X}$pretest=63.97) and the mean posttest scores ($\underline{X}$posttest=68.05) in favor of the posttest scores (t=-4.35; p<0.05). This indicates that web-assisted creative writing practices significantly improved the teachers' digital writing skills.

In order to compare the pretest and posttest scores in terms of the sub-dimensions of the digital writing scale, the Wilcoxon Signed Ranks Test was used in the analysis of the sub-dimensions of the scale, since the data did not show a normal distribution (p<0.05) according to the Kolmogorov-Smirnov Test results. Therefore, we used the Wilcoxon signed-rank test to analyze the subscale scores. Table 4 below shows the results of the analysis.

Table 4. *Wilcoxon Signed-Rank Test Results Regarding the Subscales of the Digital Writing Scale*

Subscale	Pretest-Posttest	N	Mean Rank	Total Rank	z	*p*
Digital transformation	Negative Ranks	4	13,25	53,00	-3,28	0,001
	Positive Ranks	23	14,13	325,00		
	Non-different	13				
Digital review	Negative Ranks	4	6,25	25,00	-3,70	0,000
	Positive Ranks	21	14,29	300,00		
	Non-different	15				

*Based on negative ranks

There were statistically significant differences between the pretest and posttest scores for digital transformation (z=-3.28; p<0.05) and digital review (z=-3.70; p<0.05). Given the mean ranks and total ranks of the differences, they were in favor of the positive ranks, that is, the posttest scores. This shows that web-assisted creative writing practices significantly improved the teachers' digital transformation and digital review skills.

In the study, in order to compare the pretest and posttest scores of teachers regarding digital writing habits, the Related Samples t-Test was used in the analysis of the scale total scores since the data showed normal distribution (p>0.05) according to the Kolmogorov-Smirnov Test results. Table 5 below shows the results of the analysis.

Table 5. *Paired Samples T-Test Results Regarding Teachers' Pretest and Posttest Scores for Digital Writing Habits*

Measurement	N	$\underline{X}$	S	sd	t	*p*
Pretest	40	76,57	11,59	39	-4,99	0,000
Posttest	40	85,87	10,65			

There was a statistically significant difference between the mean pretest scores ($\underline{X}$pretest=76.57) and the mean posttest scores ($\underline{X}$posttest=85.87) in favor of the posttest scores (t=-4.99; p<0.05). This indicates that web-assisted creative writing practices significantly improved the teachers' digital writing habits.

In order to compare the pretest and posttest scores of the sub-dimensions of the scale used in the study, the Related Samples t-Test was used in the analysis of the sub-dimensions of the scale, since the data showed normal distribution (p>0.05) according to the Kolmogorov-Smirnov Test results. Table 6 below shows the results of the analysis.

Table 6. *Paired Samples T-Test Results Regarding the Subscales of the Electronic Writing Habits Scale*

Subscale	Measurement	N	$\underline{X}$	S	sd	t	*p*
Psychology (interest/attitude)	Pretest	40	26,47	5,43	39	-3,37	0,002
	Posttest	40	29,84	4,82			
Purpose	Pretest	40	9,26	1,68	39	-4,76	0,000
	Posttest	40	10,51	1,64			
Daily use	Pretest	40	40,84	6,31	39	-5,18	0,000
	Posttest	40	45,5	5,15			

There was a statistically significant difference between the mean pretest scores ($\underline{X}$pretest=26.47) and the mean posttest scores ($\underline{X}$posttest=29.84) for the psychology (interest/attitude) subscale, in favor of the posttest scores (t=-3.37; p<0.05).

There was a statistically significant difference between the mean pretest scores ($\underline{X}$pretest=9.26) and the mean posttest scores ($\underline{X}$posttest=10.51) for the purpose subscale, in favor of the posttest scores (t=-4.76; p<0.05).

There was a statistically significant difference between the mean pretest scores ($\underline{X}$pretest=40.84) and the mean posttest scores ($\underline{X}$posttest=45.5) for the daily use subscale, in favor of the posttest scores (t=-5.18; p<0.05).

This proves that web-assisted creative writing practices significantly improved the teachers' skills regarding the psychology (interest or attitude), purpose, and daily use subscales.

In the study, in order to compare the pretest and posttest scores of teachers regarding educational technology standards, the Related Samples t-Test was used in the analysis of the scale total scores, since the data showed normal distribution (p>0.05) according to the results of the Kolmogorov-Smirnov Test. Table 7 below shows the results of the analysis.

Table 7. *Paired Samples T-Test Results Regarding Teachers' Pretest and Posttest Scores for Self-Efficacy Regarding Educational Technology Standards*

Measurement	N	$\underline{X}$	S	sd	t	*p*
Pretest	40	165,05	28,07	39	-5,81	0,000
Posttest	40	186,52	16,03			

There was a statistically significant difference between the mean pretest scores ($\underline{X}$pretest=165.05) and the mean posttest scores ($\underline{X}$posttest=186.52) in favor of the posttest scores (t=-5.81; p<0.05). This indicates that web-assisted creative writing practices significantly improved the teachers' self-efficacy regarding educational technology standards.

In order to compare the pretest and posttest scores in terms of the sub-dimensions of the self-efficacy scale for educational technology standards, the Wilcoxon Signed Rank Test was used in the analysis of the sub-dimensions of the scale, since the data did not show a normal distribution (p<0.05) according to the results of the Kolmogorov-Smirnov Test. So, we used the Wilcoxon signed-rank test to analyze the subscale scores. Table 8 below shows the results of the analysis.

There were statistically significant differences between the mean pretest scores and the mean post-test scores for the subscales of facilitating learning and encouraging creativity (z=-4.12; p<0.05), designing and developing learning environments and evaluation activities suitable for the digital age (z=-4.06; p<0.05), leading the learning approach of the digital age (z=-3.87; p<0.05), setting an example for digital citizenship (z=-4.02; p<0.05), and participating in professional development and leadership activities (z=-4.24; p<0.05). Given the mean ranks and total ranks of the differences, they were in favor of the positive ranks, that is, the posttest scores. This shows that web-assisted creative writing practices significantly improved teachers' self-efficacy in facilitating learning and encouraging creativity, designing and developing learning environments and evaluation activities suitable for the digital age, leading the learning approach of the digital age, setting an example for digital citizenship, and participating in professional development and leadership activities.

Table 8. *Wilcoxon Signed-Rank Test Results Regarding the Subscales of the Self-Efficacy Scale for Educational Technology Standards*

Subscale	Pretest-Posttest	N	Mean Rank	Total Rank	z	*p*
Facilitating learning and encouraging creativity*	Negative Ranks	6	8,33	50,00	-4,12	0,000
	Positive Ranks	27	18,93	511,00		
	Non-different	7				
Designing and developing learning environments and evaluation activities suitable for the digital age*	Negative Ranks	5	10,60	53,00	-4,06	0,000
	Positive Ranks	28	18,14	508,00		
	Non-different	7				
Leading the learning approach of the digital age*	Negative Ranks	5	8,90	44,50	-3,87	0,000
	Positive Ranks	25	16,82	420,50		
	Non-different	10				
Setting an example for digital citizenship*	Negative Ranks	6	14,17	85,00	-4,02	0,000
	Positive Ranks	31	19,94	618,00		
	Non-different	3				
Participating in professional development and leadership activities*	Negative Ranks	5	9,90	49,50	-4,24	0,000
	Positive Ranks	29	18,81	545,50		
	Non-different	6				

*Based on negative ranks

In order to compare the pretest and posttest scores of teachers regarding digital teaching material development self-efficacy in the research, the Related Samples t-Test was used in the analysis of the scale total scores, since the data showed normal distribution (p>0.05) according to the Kolmogorov-Smirnov Test results. Table 9 below shows the results of the analysis.

Table 9. *Paired Samples T-Test Results Regarding Teachers' Pretest and Posttest Scores for Self-Efficacy in Developing Digital Teaching Materials*

Measurement	N	$\underline{X}$	S	sd	t	*p*
Pretest	40	135,00	34,75	39	-7,82	0,000
Posttest	40	170,84	18,44			

There was a statistically significant difference between the mean pretest scores ($\underline{X}$pretest=135.00) and the mean posttest scores ($\underline{X}$posttest=170.84) in favor of the posttest scores (t=-7.82; p<0.05). This indicates that web-assisted creative writing practices significantly improved the teachers' self-efficacy in developing digital teaching materials.

In order to compare the pretest and posttest scores of the digital teaching material development self-efficacy scale sub-dimensions in the research, the Related Samples t-Test was used in the analysis of the scale sub-dimensions, since the data showed normal distribution (p>0.05) according to the Kolmogorov-Smirnov Test results. Table 10 below shows the results of the analysis.

Table 10. *Paired Samples T-Test Results Regarding the Subscales of the Self-Efficacy Scale for Developing Digital Teaching Materials*

Subscale	Measurement	N	$\underline{X}$	S	sd	t	*p*
Design	Pretest	40	45,05	17,39	39	-8,61	0,000
	Posttest	40	62,94	8,57			
Web 2.0 development	Pretest	40	70,07	15,28	39	-6,91	0,000
	Posttest	40	85,05	7,97			
Negative perspective	Pretest	40	19,86	6,16	39	-2,41	0,021
	Posttest	40	22,82	6,12			

There was a statistically significant difference between the mean pretest scores ($\underline{X}$pretest=45,05) and the mean posttest scores ($\underline{X}$posttest=62,94) for the design subscale, in favor of the posttest scores (t=-8,61; p<0,05). There was a statistically significant difference between the mean pretest scores ($\underline{X}$pretest=70,07) and the mean

posttest scores ($\underline{X}$posttest =85,05) for the web 2.0 development subscale, in favor of the posttest scores (t=-6,91; p<0,05). There was a statistically significant difference between the mean pretest scores ($\underline{X}$pretest=19,86) and the mean posttest scores ($\underline{X}$posttest =22,82) for the negative perspective subscale, in favor of the posttest scores (t=-2,41; p<0,05). Therefore, web-assisted creative writing practices significantly improved the teachers' self-efficacy regarding the design, Web 2.0 development, and negative perspective subscales.

4. Discussion and Conclusion

In the current research, we found that web-assisted creative writing practices significantly improved teachers' digital writing skills. Considering the relevant literature, researchers report that digital story writing improves digital writing skills by carrying the whole writing process to the digital environment (Gregory & Steelman, 2009; Sylvester & Greenidge, 2010; Walters, Green, Wang, & Walters, 2011). Banaszewski (2005) highlights that digital stories positively impact digital writing skills. For the Digital Writing Scale, web-assisted creative writing practices significantly improved the teachers' skills regarding the digital transformation and digital review subscales.

The digital transformation subscale involves easy access to academic sources, access to reliable sources, improving one's articles with multiple sources, accessing more sources on a subject in a shorter period of time, facilitating intertextual works, examining multiple sources at the same time, and questioning the reliability of sources. According to Aytan (2017), digital writing saves time, provides convenience, and enables archiving. Researchers also note that students tend to write long texts on the computer (Farinosi, Lim, & Roll, 2016). In this context, the opportunities that digital writing offers compared to printed sources positively affect the digital writing skills of teachers.

The digital review subscale involves contributing to content and format editing, noticing errors, facilitating receiving feedback, and facilitating content and stylistic editing. Kutlu (2013) emphasizes that digital writing reduces the restrictions associated with writing with pen and paper, alleviating the burden of writing. This is because digital writing offers some key advantages like speed, easy editing, and sharing (Maden, Banaz, & Maden, 2018). Researchers report that digital writing offers more opportunities for reviews, including more revisions (Li & Cumming, 2001). Aytan (2017) investigated the digital writing experiences of Turkish language teacher candidates on Wattpad, an e-writing application. Accordingly, the participants considered digital writing to be advantageous in terms of readability, spelling, reader-author interactions, visual appeal, time efficiency, convenience, affordability, quick feedback opportunities, constructive criticism, encouragement, archiving opportunities, and socialization. Konuk (2018) also found that Wattpad users liked the application for various reasons, such as establishing an interaction between the reader and the author, providing freedom, providing opportunities to be discovered, allowing one to share one's thoughts with others, being easy to use, being convenient, and a variety of other reasons. Therefore, our finding on digital review skills seems to support the relevant literature.

Maden, Banaz, and Maden (2018) investigated the digital writing habits of Turkish language teacher candidates. The authors concluded that teacher candidates had above-average digital writing habits. In this context, teacher candidates and working teachers are expected to have a habit of digital writing. In a study by Konuk (2018), the participants reported gaining a habit of writing thanks to Wattpad. Hence, our finding on digital writing habits appears to be consistent with the results of previous research.

For the Electronic Writing Habits Scale, we observed that web-assisted creative writing practices significantly improved the teachers' skills regarding the psychology (interest/attitude), purpose, and daily use subscales. The purpose subscale is concerned with whether individuals use electronic devices or digital media to share their thoughts, communicate, and exchange information, or for entertainment and enjoyment purposes. Maden, Banaz, and Maden (2018) observed that Turkish language teacher candidates used digital writing environments mostly for communication and exchanging information. Similarly, our participants used digital writing environments mostly for communication and exchanging information.

The daily use subscale involves preferring the keyboard over the pen, writing regularly with a keyboard, feeling the need to write with a keyboard, wanting to see digital texts on paper, preferring mobile devices in written communication, spending free time on reading and writing with mobile devices, writing fast and without errors in the digital environment, being active in lessons when typing with a keyboard, giving

importance to archiving digital texts, being in a hurry to see results when writing with a keyboard, using the benefits of the digital environment (auto-completion, correction) and internet resources (dictionary, spelling guide, etc.), examining other articles and exchanging opinions on a subject in the digital environment, and conducting research and interviews in the digital environment. Research demonstrates that individuals find writing in the digital environment increasingly more attractive, and they are competent in writing in the digital environment (Farinosi, Lim, & Roll, 2016; Neumann, 2016). Maden, Banaz, and Maden (2018) reported that Turkish language teacher candidates mostly preferred keyboards and portable devices instead of pens for written communication. Besides, their students regularly wrote on electronic devices, and using digital writing in the classroom allowed them to write quickly and without errors. Tatlı and Aksoy (2017) found that digital storytelling had positive contributions to skills and attitudes regarding computer use. Other researchers also report that digital storytelling has positive effects on technology use (Duveskog, Tedre, Sedano, & Sutinen, 2012; Yoon, 2013). Therefore, our findings on daily use seem to support the previous results.

We observed that web-assisted creative writing practices significantly improved the teachers' self-efficacy regarding educational technology standards. Özbek (2020) reports that classroom teachers have adequate skills in using digital content and technology. Eskimen and Erdoğdu (2020) examined teacher candidates who prepared a children's book using Wattpad and found that their competencies in using information and communication technologies were at a good level. Also, writing with the digital tool further improved these competencies. Hence, our finding on teachers' self-efficacy regarding educational technology standards is in agreement with the results of the relevant research.

When "The Self-Efficacy Scale for Educational Technology Standards" was investigated in terms of its subcategories, it was determined that web-assisted creative writing practices significantly improved the teachers' self-efficacy regarding all the subscales (facilitating learning and encouraging creativity, designing and developing learning environments and evaluation activities suitable for the digital age, leading the learning approach of the digital age, setting an example for digital citizenship, and participating in professional development and leadership activities).

The subscale of facilitating learning and encouraging creativity refers to using technology to improve students' creative thinking skills, guiding students to use digital tools to solve real-life problems and conduct research to solve them, encouraging students to use technology for participating in digital learning environments, facilitating learning, and collaborative learning, guiding students to conduct real-life research in the digital environment, and using technological communication environments in teaching. Göçer (2011) reports that presenting different materials to students in writing education will help develop their creativity. Researchers claim that in the interest of the learning experience (Bjørgen, 2010), digital story writing allows students to acquire numerous literacy skills that they must have in the 21st century (Mullen & Wedwick, 2008). In this context, digital story writing is effective in developing writing skills and creativity, as well as in raising original and creative individuals who can keep up with the digital age (Baki, 2019). Studies also state that digital story writing can increase the qualifications of teacher candidates (Daniels, 2013). In a study by Yamaç (2019), teacher candidates performed digital writing practices using a digital bookmaker, a digital brochure maker, a blog maker, an online collaborative writing tool, a Wiki maker, and a cartoon maker. The author concluded that the teachers could write and create online content in accordance with their perceptions, improve students' online research skills, increase collaboration and social interaction among students, bring the learning process outside the classroom, improve students' traditional writing skills, expand the target audience through the internet, increase motivation for writing and learning, produce multimodal contents, and improve students' imagination and creativity (Yamaç, 2019).

Accordingly, our finding on the subscale of facilitating learning and encouraging creativity is supported by the relevant literature. Özbek (2020) used the same scale and found that primary school teachers overall had the highest level of participation in the subscale of facilitating learning and encouraging creativity. In this regard, teachers' digital writing experiences have a great positive impact on learning-teaching environments.

The subscale of designing and developing learning environments and evaluation activities suitable for the digital age involves providing technology-enriched learning environments to monitor students' development, integrating digital tools and resources for permanent learning and creative thinking, designing appropriate learning activities for students with different learning experiences, applying technology-enriched strategies to

support diverse learning needs, using technology to evaluate learning levels and use alternative evaluation methods, using technological tools to process and report all data related to teaching, selecting the most suitable technologies for teaching, and and organizing the learning environment for using technology. Öztürk (2019) found out that most primary school teachers did not use digital content for educational purposes. Also, researchers reported that digital technologies and applications were not used as much in the classroom as in daily life (Yamaç & Öztürk, 2018). On the other hand, other studies argue that digital story writing affects the adaptation of educational technologies for learning and teaching positively by strengthening the bond between language skills and technology (Thang, Sim, Mahmud, Lin, Zabidi, & Ismail, 2014; Kurudayıoğlu & Bal, 2014). Göçen Kabaran et al. (2019) concluded that digital storytelling practices positively affected the attitudes of classroom teachers and teacher candidates towards computer-assisted education. Besides, primary school teachers and teacher candidates reported that digital story writing practices helped draw attention to the lesson, helped reach the necessary objectives, allowed the production of content with technology, and contributed to determining the main ideas of texts, thinking critically, and finding creative ideas. Thus, our finding on the subscale of designing and developing learning environments and evaluation activities suitable for the digital age seems to agree with the previous findings.

The subscale of leading the learning approach of the digital age refers to exhibiting the attitudes of an innovative teacher, using information technologies effectively, transferring knowledge to new technologies, guiding the correct use of digital technologies, and continuously developing oneself in technological tools. Competency in information and communication technologies is associated with knowledge of technological and pedagogical contents (Kabakçı-Yurdakul, 2011). Bal (2017) found that Turkish language teacher candidates had significant deficiencies in integrating technological, pedagogical, and content knowledge. According to Özbek (2020), classroom teachers had the lowest participation regarding the subscale of leading the learning approach of the digital age. Researchers argue that teachers need to develop their competencies in using technology in learning and teaching, acquire the necessary pedagogical knowledge and content knowledge, and acquire the necessary knowledge and skills to use technology (Eskimen & Erdoğdu, 2020). In this regard, teachers must have experience in using education technologies and integrating them into learning environments. Tokmak, İncikabi, and Özgelen (2013) performed technological and pedagogical teaching activities based on content knowledge with teacher candidates and reported that their competencies in using technology and applying technology to the educational environment increased after the activities. Tatlı, Akbulut, and Altınışık (2016) organized training on the use of Web 2.0 tools for educational purposes for senior teacher candidates. The authors observed a significant increase in the participants' self-confidence levels regarding technological and pedagogical content knowledge. In the present study, we noted a positive improvement in the self-efficacy levels of the teachers who participated in web-assisted creative writing activities regarding the subscale of leading the learning approach of the digital age.

The subscale of participating in professional development and leadership activities stands for monitoring innovations in information and communication technologies, using these technologies effectively for professional development and being a lifelong learner, exchanging information with teachers online for professional development, participating in national and international communities and examining effective technology applications that would contribute to students' learning, leading one's colleagues for effectively using technology in education by creating e-mail groups and other social groups, following studies on this subject and using these to contribute to students' learning. Today, the qualifications a teacher needs are underlined in the Overall Competencies of The Teaching Profession (MoNE [MEB], 2017). In this context, teachers should have basic hardware and software skills, follow the innovations in information and communication technologies, and strive to be leaders in integrating the current advances into learning-teaching environments (UNESCO, 2011). Tatlı, İpek-Akbulut, and Altınışık (2016) suggest that using web 2.0 tools and integrating them into the classroom makes teacher candidates professionally competent. In this context, teachers need to achieve competency and experience in information and communication technologies. Similar to the previous findings, we recorded a positive improvement in the self-efficacy levels of the teachers who participated in web-assisted creative writing activities regarding the subscale of participating in professional development and leadership activities.

For the Self-Efficacy Scale for Developing Digital Teaching Materials, we observed that web-assisted creative writing practices significantly improved the teachers' self-efficacy regarding all the subscales (web 2.0

development, design, and negative perspective). This indicates that the teachers can use the knowledge and experience that they have gained from the activities in various areas of the learning and teaching environment.

The subscale of web 2.0 development involves creating graphics, figures, objects, presentations, interactive measurement tools, videos, interactive activities, multimedia teams, concept maps, worksheets, cartoons, animations, surveys, and 3D models using web 2.0 software, editing pictures and photographs on such software, and developing content with aesthetic appearance.

Baki (2019) reported that Turkish language teacher candidates' skills of integrating visuals into stories, using sounds effectively, integrating sounds into stories, and using appropriate music were poor. Göçen Kabaran et al. (2019) reported that classroom teachers and candidates gained some competencies in applying digital storytelling methods in teaching-learning processes. In the current research, we observed improved self-efficacy regarding the web 2.0 development subscale in the teachers who created digital bulletin boards, digital cartoons, and digital stories in the relevant activities.

The subscale of design involves paying attention to appropriate font, font size, colors, contrasting colors, visual appeal, title, readability, and harmony in content and materials, placing items by preserving the integrity, designing materials suitable for general use, different learning styles, and grade levels, considering the characteristics of the target audience while creating content, and designing content to foster creative and critical thinking. According to Korkmaz (2011), teachers need to have a good command of design principles, design elements, and the principles of effectively using educational materials. Research shows that creating digital stories improves the skills of converting audio, music, visuals, and texts into a meaningful whole (Kearney, 2011). In the study by Göçen Kabaran et al. (2019), teachers found digital storytelling activities to be the most beneficial, while teacher candidates considered creating images and integrating story materials as the most useful activities. Again, consistent with the relevant literature, we found improved self-efficacy regarding the design subscale in the teachers who created digital stories and cartoons in the relevant activities.

The subscale of negative perspective refers to feeling inadequate in preparing digital teaching materials related to the content, having difficulties in preparing materials according to visual design principles, goals, and achievements, believing that web 2.0 tools would take too much time, having difficulties in using digital platforms in classroom management, and having difficulties in preparing materials for different learning styles.

Studies highlight that while attitudes towards digital writing increase, writing on paper is yet to be completely abandoned (Baştuğ & Keskin, 2017). Maden, Banaz, & Maden (2018) reported that Turkish language teacher candidates gained the habit of digital writing and developed a positive attitude towards digital writing, though they still wanted to see the texts on paper. This could be associated with the participants' negative attitudes and experiences. Changing such negative attitudes depends on gaining more experience in the field. Here, we noted fewer negative perspectives and increased self-efficacy regarding developing digital teaching materials among the teachers who wrote their texts using a keyboard, received information about education technology tools, observed relevant examples, experienced various teaching technologies, and were among those who created digital stories and cartoons in the relevant activities.

We suggest organizing in-service training sessions for teachers to inform them about educational technologies and show relevant examples. We also suggest integrating educational technologies into writing education, teaching writing skills in practice, and including digital writing practices to provide teachers with experience. Taking such actions would be of great importance for helping teachers adapt to today's educational environments and for preparing their students for the future with the literacy skills that the 21st century necessitates.

The present study was conducted with classroom teachers and Turkish language teachers. Further research with the participation of different branches would improve the teachers' digital writing skills and habits by changing their self-efficacy perceptions towards educational technology standards positively and developing digital teaching materials.

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