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The Relationship between the Digital Literacy Levels of Turkish Language Teacher Candidates and Their Attitudes Towards Digital Writing

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ABSTRACT

The purpose of this study is to explore the levels of digital literacy among Turkish teacher candidates as well as their attitudes about digital writing, and to investigate the relationship between these variables. The survey model is used in this study using a quantitative research approach. The sample of the research consists of 556 Turkish language teacher candidates studying at 18 different public universities in Turkey in the fall of the 2021-2022 academic years. In this study, personal information form, Digital Literacy Scale, and Attitude Scale for Digital Writing (DWS) are employed as data collection tools. The data are analyzed using correlation and regression analysis test. The research findings show that the digital literacy levels of Turkish language teacher candidates and their attitudes towards digital writing are moderate. These findings disclose a necessity to improve both the digital literacy of Turkish teacher candidates and their attitudes towards digital writing. Additionally, the results generally reveal a favorable and significant correlation between the participants' attitudes regarding digital writing and their degrees of digital literacy. The findings of the present study are examined in the light of the literature, and different recommendations are developed.

Key words: Writing, Digital Literacy, Digital Writing, Turkish Language Teacher Candidates

INTRODUCTION

With the development of technology, digital environments have started to play an even more important role in our lives. The definition of literacy in the modern world is changing from monoliteracy to multiliteracy, which encompasses information and communication technology. As a result, reading and writing have changed in nature (Yamaç et al., 2020). Today, individuals have started to use digital tools such as computers, tablets, and smart phones more and more to obtain and disseminate information. Therefore, today it is very important to perceive and make sense of the texts that are transmitted through the screen. For this reason, digital literacy has its place among important skills these days (Duran & Ertan Özen, 2018). Digital literacy is known as the awareness, mindset, and aptitude to recognize, handle, integrate, assess, and synthesize digital resources; to use digital tools and opportunities appropriately to create new information, create media expressions, and communicate with others (Martin, 2018, pp. 166-167). As it can be reasoned from these explanations, the individual's ability to communicate with others using digital tools is related to digital literacy. Today, most of the communication using digital tools is done through writing, which is called digital writing. Therefore, the idea that an individual's digital literacy level can be related to his/her attitude towards digital writing constitutes the hypothesis of this research. Hence, the digital literacy of Turkish language teacher candidates and their perception of writing in digital environments are discussed in this study and the relationship between the two variables is examined.

LITERATURE REVIEW

Paul Gilster developed the idea of digital literacy in the way that it is used today. Digital literacy is the capacity to comprehend and make use of information from digital resources according to Gilster (1997, as cited in Bawden, 2008, p. 18) who regarded this idea as the literacy of the digital age. Digital literacy includes not only the ability to use software or operate a digital device, but also the cognitive, affective, and motor skills that one needs to have in order to be able to use digital environments effectively (Alkali & Amichai-Hamburger, 2004). Therefore, digital literacy has become nowadays an important part of almost everyone's life (Reddy et al., 2022). As a matter of fact, according to a report published by the Turkish Statistical Institute in 2021, the rate of internet use among individuals aged 16-74 in Turkey is 82.6%, as opposed to 79.0% in the previous year. According to the same report, when the last 15 years are taken into consideration, the number of households with information technologies (computers, tablets, smart phones, etc.) has increased significantly. This shows that the use of internet and

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information technologies is increasing in Turkey as well as across the world. In this case, the conscious use of digital technologies for purposes such as communicating, acquiring, and disseminating information has become increasingly essential. This application highlights the value of digital literacy skills, and it emphasizes the importance of these skills.

The act of writing, which was traditionally carried out using paper and pen, has now been replaced with writing done through digital tools. This change has reached such a dimension that Kiefer and Velay (2016) state that adults today typically write with digital tools, so writing using paper and pencil can sometimes be considered redundant. Digital writing can be carried through various devices (computers, smartphones, smart watches, etc.), applications (Microsoft Word, Google Docs, etc.), chat platforms (WhatsApp, WeChat, Telegram, etc.), social media platforms (Twitter, Facebook, Instagram, etc.), video sharing platforms (YouTube, TikTok, etc.) and many similar tools (De Roock, 2021, pp. 184-185). Thus, technological developments have changed the way individuals use linguistic abilities such as reading, writing, speaking, and listening.

Bawden (2008, p. 28) stated that the concept of digital literacy is described by some as e-literacy or information literacy. He expressed that digital literacy seems to be a logical name today when access to information is considered. Pala and Başıbüyük (2020) mentioned that digital technologies are used in education as well as in many other fields and underlined the importance of digital literacy skills for individuals so that they can benefit from these technologies. Studies show that digital literacy is important for individuals to adapt oneself to the developing world (Öztürk & Budak, 2019). One of the aims of education is to help individuals keep up with innovation and change. Hence, it is of great importance for teachers to acquire digital literacy (Alanoglu et al., 2021).

The findings of the study conducted by Shopova (2014) show that improving students' digital literacy is significant in terms of achieving success and showing better performance in the teaching process. Making the learning process more efficient in the university environment requires gaining the skills of searching and finding useful information sources as well as developing the skills of analyzing, synthesizing, sharing, and discussing the information obtained (Shopova, 2014, p. 31). These are associated with students' digital literacy skills. Therefore, digital literacy is crucial for improving the effectiveness of the learning process.

The social and technological developments experienced have led children to use digital tools for education, entertainment and communication (Yurtseven Yılmaz & İpek, 2021). Developments in the digital world have opened up new possibilities for communication. The younger generation has embraced these possibilities to a great extent. It is possible to benefit from the opportunities offered by digital tools for writing (Dahlström, 2019, p. 1563). With the use of digital tools, writing on the screen with the keyboard has replaced writing on paper using a pen. Fortunati and Vincent (2014) mentioned that digital writing has advantages over writing with a pen in the following ways. First, grammatical, syntactic, spelling, and punctuation errors in digital writing can be automatically corrected by tools such as spelling checkers. Secondly, making changes and editing with the keyboard while typing can be done more easily when compared to writing with pen and paper. Additionally, digital writing permits copying, pasting, and highlighting the selected parts of the text easily. Also, any piece of writing can be reproduced and shared in a very short time in the digital environment. Moreover, some students find digital writing less tedious. All of this has led to digital writing to come to the forefront as a critical skill today. That being said, the importance of attitudes in terms of writing skills has been emphasized in many studies (Graham et al., 2007; Kear et al., 2000; Sarkhoush, 2013). Students' attitudes towards school, teachers, lessons, and many skills such as reading, and writing can develop positively or negatively (Baştuğ & Keskin, 2013). Hence, it is important to assess and improve students' attitudes towards digital writing. Considering that digital writing is carried out using digital tools, it can be predicted that digital literacy skills may affect the attitudes towards digital writing.

The purpose of this study is to investigate how pre-service teachers' attitudes toward digital writing and their literacy levels relate to one another. In order to do this, responses to the following questions are required:

1. What are the digital literacy levels of teacher candidates and their attitudes towards digital writing?
   - 1.1. Do teacher candidates' digital literacy levels and their attitudes towards digital writing differ significantly according to the gender variable?
   - 1.2. Do teacher candidates' digital literacy levels and their attitudes towards digital writing differ significantly according to the age variable?
   - 1.3. Do teacher candidates' digital literacy levels and their attitudes towards digital writing differ significantly according to the university grade level variable?
2. Is there a significant relationship between the teacher candidates' digital literacy levels and their attitudes towards digital writing?
3. Is the digital literacy level of teacher candidates a significant predictor of their attitudes towards digital writing?

METHOD

Research ,Model

The quantitative research design is used in this study to examine the correlation between teacher candidates' attitudes toward digital writing and their degrees of digital literacy. In line with the purpose of the study, the relational survey model, a quantitative research model is used. The relational survey model aims to reveal whether there is a co-change between two or more variables and the degree of change (Karasar, 2012, p. 81).

Sample

The research population of this study is Turkish language teacher candidates studying in Turkey. The sample consists of a total of 556 Turkish language teacher candidates

studying at 18 different public universities in Turkey. The participants' demographic information has been presented in Table 1.

An examination of Table 1 shows that 235 of the participants are in the 17-20 age group; 250 are in the 21-23 age group, and the remaining 71 are in the 24 and over age group. Besides, it is revealed that 158 of the participants are male and 398 of them are female. In addition to these, it is seen that 146 of them are freshmen, 153 are sophomores, 107 are juniors, and 150 are seniors.

Data Collection Tools

In this study, three alternative data gathering methods are employed. One of these is the personal information form developed by the researchers. The second is "Attitude Scale for Digital Writing (DWS)" developed by Susar Kırmızı et al. (2021). The other data collection tool is the "Digital Literacy Scale" developed by Ng (2012) which was adapted into Turkish by Üstündağ et al. (2017). Factor analysis and reliability analysis for the scales used in the research have been done beforehand. Cronbach's Alpha coefficients are calculated to determine whether the factors revealed by the developers of the scales are reliable in this study as well. The data collection tools are discussed below in detail:

The personal information form

The researchers themselves created the personal information form. This form contains questions to determine the participants' universities, age, gender and university grade levels.

Table 1. The participants' demographic information

University	***f***	**%**
Nevşehir Hacı Bektaş Veli University	132	23.7
Tokat Osmangazi University	132	23.7
Amasya University	113	20.3
Düzce University	54	9.7
Hakkari University	40	7.2
Others (Kafkas, Alanya Alaaddin Keykubat, Ahi Evran, Artvin Çoruh, Ondokuz Mayıs, Erciyes, Kilis 7 Aralık, İnönü, Kırıkkale, Kütahya Dumlupınar, Gaziantep, and Adıyaman Universities)	85	15.2
Age		
17-20	235	42.3
21-23	250	45
24 and over	71	12.8
Gender		
Male	158	28.4
Female	398	71.6
University Grade Level		
1 (Freshman)	146	26.3
2 (Sophomore)	153	27.5
3 (Junior)	107	19.2
4 (Senior)	150	27

Attitude Scale for Digital Writing (DWS)

As a result of the validity and reliability studies conducted with 1501 participants by Susar Kırmızı et al. (2021), it was determined that the DWS consisted of three subscales (convenience, motivation, and effect) and of 25 items. The variance value was determined to be 38.31% while Cronbach's Alpha coefficient was determined to be.83. To ensure the reliability of the study, the Cronbach's Alpha coefficient for the DWS within the scope of this study was calculated. Accordingly, the Cronbach's Alpha coefficient value of the DWS calculated separately for this study is.88 which indicates that the DWS is highly reliable. While the highest score that can be obtained from this scale is 125, the lowest is 25. A high total score indicates that the participants have positive attitudes towards digital writing, while a low score indicates that they have negative attitudes towards it (Susar Kırmızı et al., 2021).

Digital Literacy Scale

The Digital Literacy Scale was developed by Ng (2012), and its adaptation into Turkish was done by Üstündağ et al. (2017). The scale was adapted, and it was said that it had 10 components that were collected into a single factor. The Cronbach Alpha Coefficient was.86, indicating that the scale was reliable. The Cronbach's Alpha reliability coefficient for the Digital Literacy Scale was separately calculated in this study, and as a result, the reliability value was determined to be.89 which means that the Digital Literacy Scale has high reliability.

Data Analysis

In this study, the data obtained through DWS and Digital Literacy Scale were first transferred to the Excel program, then edited here and transferred to the SPSS (version 21) package program and analyzed using this program. Next, firstly, whether the data met the normality assumptions was checked and which statistical operations would be performed on the data was decided upon. Skewness and Kurtosis values were calculated to test the normality distribution of the data. Moreover, Cronbach's Alpha coefficients were analyzed for each scale used in the research to demonstrate reliability. Mann Whitney U and Kruskal-Wallis H tests were used to determine whether there was a significant difference according to age, gender and grade level. Correlation analysis was done to define the relationship between pre-service teachers' digital competence and their perception of digital writing. The guide values put forth by Cohen (1988) were taken into account in the calculation of the correlation coefficients. According to the guideline values specified by Cohen (1988), the range from.10 to.29 indicates a small relationship, the range from.30 to.49 indicates a moderate relationship, and the range from.50 to 1.0 indicates a large relationship. After the correlation analysis was done, a regression analysis was carried out to determine whether teacher candidates' levels of digital literacy are a reliable indicator of their attitudes toward digital writing.

FINDINGS

Prior to the analysis of the data obtained in the research, it was tested whether the data met the normality assumption, and which statistical tests would be applied was decided upon accordingly. The findings regarding whether the data obtained in the study meet the normality assumption are presented in Table 2.

When Table 2 is examined, it is seen that the data obtained from both scales in Kolmogorov-Smirnov and Shapiro-Wilk tests show a statistically significant distribution ($p<.05$). This indicates that the data do not meet the normality assumption. Therefore, non-parametric tests were chosen for data analysis.

The first question of the study is "What are the digital literacy levels of teacher candidates and their attitudes towards digital writing?". The findings regarding the answer to this question are presented in Table 3.

When Table 3 is examined which contains the findings regarding the participants' attitudes towards digital writing and their digital literacy levels, it is observed that the item average of the general scores of the participants in the DWS towards digital writing is 3.38. Moreover, as it can be observed, the item average of the participants' overall scores from the digital literacy scale is 3.36. While the highest score that can be obtained from each item in these scales is 5, the lowest score is 1. In this case, it can be inferred that the participants' attitudes towards digital writing and their digital literacy scores are moderate.

One of the sub-questions under the first question of this study is "Do teacher candidates' digital literacy levels and their attitudes towards digital writing differ significantly according to the gender variable?". The Mann Whitney U Test was used to investigate this issue, and the outcomes are shown in Table 4.

An analysis of Table 4 reveals that the scores obtained from the motivation and effect dimensions of the teacher candidates' attitudes towards digital writing and the digital literacy general scores show a statistically significant difference in terms of the gender variable ($p<.05$). It becomes clear that this considerable difference is in favor of males for both scores when the mean rank and rank sum are considered.

Another sub-question under the first question of the study is "Do teacher candidates' digital literacy levels and their attitudes towards digital writing differ significantly according to the age variable?". Table 5 illustrates the results in relation to this question.

Analysis of Table 5 reveals that the participants' attitudes towards digital writing do not differ significantly according to the age variable ($p>.05$), but their digital literacy shows a significant difference according to the age variable ($p<.05$). If

Table 2. Normality distribution of the data

Measurement Tools	Subscales	Kolmogorov-Smirnov			Shapiro-Wilk		
		Statistics	df	p	Statistics	df	p
Attitude Scale for Digital Writing (DWS)	Convenience	0.140	556	0.000	0.881	556	0.000
	Motivation	0.074	556	0.000	0.971	556	0.000
	Effect	0.093	556	0.000	0.973	556	0.000
Digital Literacy Scale		0.046	556	0.007	0.990	556	0.001

Table 3. Digital literacy levels of Turkish language teacher candidates and their attitudes towards digital writing

Measurement Tools	Subscales	N	Min	Max	Mean	SD
Attitude Scale for Digital Writing (DWS)	Convenience	556	1.00	5.00	4.1815	0.75853
	Motivation	556	1.00	5.00	2.7347	1.04043
	Effect	556	1.00	4.67	2.3097	0.70936
	General	556	1.36	4.68	3.3850	0.56705
Digital Literacy Scale		556	1.10	5.00	3.3601	0.80978

Table 4. Teacher candidates' digital literacy levels, their attitudes towards digital writing and the comparison between the two variables in terms of gender

Scales	Gender	N	Mean Rank	Rank Sum	U	Z	p
DWS - Convenience	Male	158	287.44	45416.00	30029.000	-0.828	0.408
	Female	398	274.95	109430.00			
DWS - Motivation	Male	158	300.59	47493.50	27951.500	-2.046	0.041
	Female	398	269.73	107352.50			
DWS – Effect	Male	158	307.39	48567.50	26877.500	-2.679	0.007
	Female	398	267.03	106278.50			
Digital Literacy	Male	158	318.03	50249.00	25196.000	-3.659	0.000
	Female	398	262.81	104597.00			

the mean rank is looked at, it is found that this difference in the level of digital literacy is in favor of the 21-23 age group.

Another sub-question under the first question of the study is "Do teacher candidates' digital literacy levels and their attitudes towards digital writing differ significantly according to the university grade level variable?". Findings related to this question are presented in Table 6.

Table 5. Teacher candidates' digital literacy levels and their attitudes towards digital writing and the comparison between the two variables in terms of age

Scales	Age	N	Mean Rank	Sd	X^2	p
DWS Convenience	17-20	235	264.56	2	5.737	0.057
	21-23	250	296.49			
	24 and over	71	261.29			
DWS Motivation	17-20	235	261.30	2	4.845	0.089
	21-23	250	293.03			
	24 and over	71	284.27			
DWS Effect	17-20	235	282.80	2	1.607	0.448
	21-23	250	280.81			
	24 and over	71	256.12			
Digital Literacy	17-20	235	251.45	2	14.558	0.001
	21-23	250	306.57			
	24 and over	71	269.17			

When Table 6 is analyzed, it is seen that there is a statistically significant difference ($p<.05$) in both the motivational attitude scores of the participants towards digital writing and the scores of their digital literacy levels in terms of the university grade level variable. When the mean rank is examined, it is seen that this difference is in favor of those in upper university grade levels in both score types.

The second question of the study is "Is there a significant relationship between the teacher candidates' digital literacy levels and their attitudes towards digital writing?". Using correlation analysis, it was determined whether the teacher candidates' levels of digital literacy and attitudes toward digital writing were related. The results are shown in Table 7:

When Table 7 is analyzed, there is a high level of correlation between candidate teachers' Digital Literacy Scale measurements and their DWS Convenience Scale (r=.635), and a moderately significant relationship between Motivation Scale (r=.479) measurements. However, there is

Table 6. Teacher candidates' digital literacy levels, their attitudes towards digital writing and the comparison between the two variables in terms of their university grade level

Scales	University Grade Level	N	Mean Rank	df	X^2	p
DWS Convenience	1 (Freshman)	146	253.59	3	7.579	0.056
	2 (Sophomore)	153	270.23			
	3 (Junior)	107	299.11			
	4 (Senior)	150	296.48			
DWS Motivation	1 (Freshman)	146	247.71	3	21.035	0.000
	2 (Sophomore)	153	288.87			
	3 (Junior)	107	245.90			
	4 (Senior)	150	321.15			
DWS Effect	1 (Freshman)	146	279.67	3	3.007	0.391
	2 (Sophomore)	153	275.21			
	3 (Junior)	107	259.58			
	4 (Senior)	150	294.21			
Digital Literacy	1 (Freshman)	146	242.49	3	14.874	0.002
	2 (Sophomore)	153	276.50			
	3 (Junior)	107	280.20			
	4 (Senior)	150	314.38			

Table 7. Pearson product-moment correlation between candidate teachers' digital literacy levels and their attitudes towards digital writing

Measurement Tools	Digital Literacy Scale	DWS Convenience Scale	DWS Motivation Scale	DWS Effect Scale	DWS General
Digital Literacy Scale	-				
DWS Convenience Scale	0.635**	-			
DWS Motivation Scale	0.479**	0.328**	-		
DWS Effect Scale	0.038	-0.102*	0.280**	-	
DWS General	0.664**	0.809**	0.752**	0.353**	-

**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

Table 8. Multiple regression analysis results regarding the relationship between digital literacy levels of candidate teachers and their attitudes towards digital writing

Tools	B	SE	ß	t	p	Tolerance	VIF
DWS Convenience Scale	0.574	0.035	0.538	16.272	0.000	0.852	1.174
DWS Motivation Scale	0.233	0.027	0.300	8.752	0.000	0.793	1.261
DWS Effect Scale	0.010	0.037	0.009	0.282	0.778	0.879	1.137
Constant	0.296	0.168		1.757	0.079		

not a significant correlation between Digital Literacy Scale measurements and DWS Effect Scale (r=.038). It is seen that there is a high-level relationship between the measurement scores of the participants from the whole DWS Scale and the measurement scores they got from the overall Digital Literacy Scale (r=.664).

The third question of the study is "Is the digital literacy level of teacher candidates a significant predictor of their attitudes towards digital writing?". Whether the digital literacy levels of candidate teachers are a significant predictor of their attitudes towards digital writing were tested by regression analysis, and the results are presented in Table 8:

When Table 8 is analyzed, it is seen that the digital literacy levels of candidate teachers are a significant predictor of their attitudes towards digital writing except for the Effect Scale. A close look at the table reveals that when the digital literacy levels of candidate teacher increase by 1 unit, DWS Convenience Scale scores increase by.57 unit and DWS Motivation Scale scores increase by.23 unit. It is understood that there is no significant change in the DWS Effect Scale scores.

DISCUSSION AND CONCLUSIONS

The findings of this research showed that the digital literacy levels of the participants and their attitudes towards digital writing were moderate. The findings of the research conducted by Yontar (2019) also showed that candidate teachers have a moderate level of digital literacy. Moreover, studies carried out by Ustabulut (2021) and Elkıran (2021) indicate that the attitudes of Turkish language teacher candidates towards digital writing are at a level that can be improved. These findings show that candidate teachers' digital literacy skills should be further developed, and they should be provided with support to develop positive attitudes towards digital writing. As a matter of fact, it has been stated in many studies that digital literacy skills have an increasing importance in today's world (Hamutoğlu et al., 2017; Duran & Ertan Özen, 2018; Onursoy, 2018; Santos & Serpa, 2017; Shopova, 2014). After all, today, as the concept of writing using digital tools has replaced writing with pen and paper, digital writing has emerged. In many studies, the importance, or the positive and negative aspects of digital writing (Dahlström, 2019; Aktas & Akyol, 2020; Merchant, 2007) are mentioned. Additionally, it has been stated that affective dimensions of writing such as attitude, perception, anxiety, and motivation may be related to success in writing (Demir, 2013; Demirel, 2019; Ulu, 2018). Consequently, it can be said that students' attitudes towards digital writing are important. The research findings indicate that Turkish language teacher candidates' attitudes towards digital writing are at a moderate level, and therefore, they can be improved. For this reason, it would be useful to carry out studies including suggestions of what to implement in order to develop positive attitudes in students towards digital writing.

The results revealed a significant disparity in favor of males in both the participants' levels of digital literacy and their attitudes toward digital writing. In many studies on the subject (Yontar, 2019; Özerbaş & Kuralbayeva, 2018; Yaman, 2019), it has been determined that males have higher digital literacy levels than females. This may be because males use digital technologies more than females and show more interest in them. As a matter of fact, according to the data from the Turkish Statistical Institute (2018; 2021), the rate of internet and computer usage is higher for males than females in general.

The results revealed a considerable disparity in the participants' levels of digital literacy, favoring the 21–23 age group. Aksoy et al. (2021) stated that the digital literacy of teachers between the ages of 21-30 is high, and their digital literacy levels decrease as their age increases. The findings of this study indicate that the participants in the age group of 24 and over have lower digital literacy than those in the age group of 21-23. In addition, the findings showed that both the participants' degrees of digital literacy and their attitudes toward digital writing were significantly different, favoring those in upper university grade levels. The reason for this difference may be the climate of the universities and the education received there. As a matter of fact, in the first years of university curriculum, there are courses such as information technologies, which have the potential to have an impact on students' digital literacy skills and their attitudes towards digital writing. In addition, universities are institutions where digital technologies are more commonly used for purposes such as acquiring information, communicating, writing, and reading, and universities intend to improve digital literacy among the students.

The research findings showed that there is a significant relationship between the participants' digital literacy levels and their attitudes towards digital writing. According to the findings, those with higher digital literacy levels have more positive attitudes towards digital writing. However, those with lower digital literacy levels have a more negative attitude towards digital writing. De Roock (2021) stated that many different digital tools such as smartphones, tablets, and computers, are used for digital writing. However, Bawden (2008) pointed out that using tools like those correctly for purposes such as obtaining information and learning is

within the scope of digital literacy. Therefore, individuals who can use such tools correctly are generally ones with higher digital literacy, and they can be expected to have a more positive attitude towards writing with such tools. As a matter of fact, the findings obtained in this study show that individuals with higher digital literacy levels have more positive attitudes towards digital writing.

In the study, it was found that the participants' digital literacy levels predicted their digital writing attitudes in convenience and motivation dimensions. These findings indicate that participants with higher digital literacy levels can benefit more from the convenience of writing in digital environments. Moreover, these findings indicate that participants with higher digital literacy are more willing to do digital writing. The reason why participants with higher digital literacy levels are more willing to write digitally may be that they are able to benefit more from the convenience of digital writing. For this reason, teaching practices that utilize digital tools can be useful in teaching writing. As a matter of fact, in the research conducted by Yamaç et al. (2020), it was revealed that the students who participated in the teaching of writing using tablets were able to produce more qualified stories than the students who wrote using pens and paper. Also, the findings of the research carried out by Wen and Walters (2022) showed that technology influences the quality and quantity of writing.

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