

An Analysis of Handwriting Legibility of First Grade Students by School Starting Age

İlhan Polatⁱ
Ministry of Education

Cengiz Kesikⁱⁱ
Harran University

Abstract

Legibility, which can be defined as the format of the text, is one of the key elements in teaching writing. School starting age can affect students' learning and writing, and determining it can give an idea about what type of work to be undertaken to ensure the legibility of the handwriting in the early reading and writing processes. The possible effect of the school starting age on the legibility of handwriting was the basis of this study. As such, the study aimed to examine the straight basic writings of primary school first grade students in terms of legibility based on the school starting age. The study was designed as a survey in the quantitative research method. The study group consists of 513 primary school first grade students. The convenience sampling method was chosen to determine the study group. The students who participated in the study voluntarily consisted of primary school first-year students who passed into literacy in May of the 2022-2023 academic year. Data were obtained using the Multidimensional Legibility Scale. The Mann-Whitney U test was used in the analysis of the data. Results revealed that the handwriting legibility of the students was moderate regarding the dimensions of slant, spacing, size, and line awareness, but not legible in terms of 'form'. While the results of this study show that the average handwriting legibility of girls is higher than that of boys, there is no statistically significant difference between the age of school entry and handwriting legibility.

Keywords: Handwriting Legibility, School Starting Age

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ⁱ **İlhan POLAT**, Ph.D., Van İlknur İlcalı Primary School, Ministry of Education, Turkey, ORCID: 0000-0002-7802-6337

Correspondence: ilhan_polatt@hotmail.com

ⁱⁱ **Cengiz KESİK**, Assist. Prof. Dr., Faculty of Education, Harran University, Turkey, ORCID: 0000-0001-9777-0076

INTRODUCTION

As social beings, individuals need some skills to express themselves in the environment they live in and the society they are part of. While the individual expresses him/her self by speaking in the preschool period, she/he expresses him/her self through writing after learning how to write after starting school. There are various definitions of handwriting in the literature. While Güneş (2021) defines writing as a process consisting of various steps such as holding a pencil, writing letters, activating prior knowledge, organizing in the mind, texting and reviewing, Akyol (2020) describes it as the production of symbols necessary to convey thoughts and ideas through motor skills. Examining the related definitions, it is clear that writing is a process and integrated skill that emerges as a result of mental and physical operations. It is important for the individual to develop his/her writing skills, to express his/her feelings and thoughts, and to be able to write legibly, as it is a skill that is used for a lifetime.

The stage in which the individual will formally learn the writing skill and take critical steps regarding this skill is the first grade of primary school. At this stage, individuals progress towards automation in writing skills by learning letter symbols, during which classroom teachers should not rush and perform the necessary preparation and awareness-raising activities to help learners acquire legible writing skills. In addition to all these, the development of writing skills is not limited to the first grade of primary school, but should be developed by spreading it to all education levels. In this way, the writing skill will develop better, the individual will be able to express him/her self more accurately, and convey his/her thoughts to other people more effectively. Göçer (2019) states that the development of an individual's writing skills can positively affect their cognitive, social and academic achievements.

Some variables play a role in the development of writing skills, which are grouped in various ways in the literature. While Feder and Mejnemer (2007) found that variables such as fine motor muscle control, visual motor adaptation, hand preference, visual perception and emotional awareness in the fingers are key factors in the development of writing skills, Coşkun (2019) concluded that variables such as muscle development, writing direction, hand preference, holding a pencil, sitting position, letters, and line awareness are crucial. These variables may affect the legibility of writing, which is one of the many factors that affect the development of writing skills. Writing legibility, which has dimensions such as education, line awareness, letterform-size-ratio, and spacing between letters and words, needs to be developed together with writing skills (Tok & Erdoğan, 2017). Not following the aforementioned dimensions, not noticing mistakes related to them, not having mistakes corrected, and not being given feedback may cause the individual to form illegible writing habit. In addition to all these, whether the age of starting school affects the legibility of writing has been a matter of curiosity, which has led to the current study focusing on the variable of school starting age.

Legibility, which can be defined as the format of the text, is one of the key elements in teaching writing. Reviewing the relevant research literature in Turkey reveals some studies on legibility (Babayiğit, 2018; Doğan & Doğan, 2018; Ekmekçi & Kasa Ayten, 2022; Gök & Baş, 2020; Kodan, 2016; Kuşdemir, Kurban & Bulut, 2018; Kuşdemir, Katrancı & Arslan, 2018; Okatan & Arslan Özer, 2020; Ulu, 2019; Yıldırım, 2019; Yıldız, 2013; Yıldız, Yıldırım & Ateş, 2009). Some of these studies focused on slant, spacing, size, form, and line awareness elements, while others tried to improve the legibility of writing according to different strategies, methods and techniques, or compared the legibility of the text, and also determined the legibility levels of the students' writing. When the studies in the literature were examined, handwriting legibility was found to have been examined by various variables. However, no research could be found that indicates that the handwriting legibility may differ by the age of starting school. School starting age can affect students' learning and writing, and determining it can give an idea about what type of work to be undertaken to ensure the legibility of the handwriting in the early reading and writing processes. The possible effect of the school starting age on the legibility of handwriting was the basis of this study. As such, the study aimed to examine the straight basic writings of primary school first grade students in terms of

legibility based on the school starting age, and for this purpose, the answers were sought for the following questions:

1. What is the level of legibility of the straight basic writings of primary school first grade students?
2. Does the handwriting legibility of primary school first grade students vary by
 - a) gender?
 - b) the age of starting school?

METHOD

Research design

The study, in which the straight basic writings of primary school first grade students were examined in terms of legibility on the basis of their school starting age, was designed as a survey in the quantitative research method. The survey design is defined as the collection and description of data to reveal the characteristics of events and phenomena that existed in the past or exist in present (Büyüköztürk et al., 2023).

Study group

The study group consists of 513 primary school first grade students. The school starting age in Turkey is 72 months as of the end of September of the enrollment year. In However, 66, 67 and 68 months old children who have a written request from their parents are also enrolled in the first grade of primary school. Parents of those who are 69, 70 and 71 months old can send their child to pre-school education or postpone their enrollment for one year (MEB, 2019). The convenience sampling method was chosen to determine the study group. Since this method is quick and easy to apply, it is a frequently preferred method (Patton, 2005). The students who participated in the study voluntarily consisted of primary school first-year students who passed into literacy in May of the 2022-2023 academic year. The distribution of the students by their school starting age and gender is as shown in Table 1.

Table 1. Demographic information

Students		f	%
Gender	Girl	247	48,14
	Boy	266	51,85
Age of starting school	66-71 months	73	14,23
	72+ months	440	85,76
Total		513	100

Looking at the table, the gender distribution can be seen to be balanced. When Table 1 is examined, 14.23% of the students are 66-71 months old and 85.76% are 72 months old and above.

Data Collection

The data were obtained by using the *Multidimensional Legibility Scale* developed by Yıldız and Ateş (2007) based on student handwritings. There are 5 dimensions in the scale: slant, spacing, size, form, and line awareness (staying on the line). The need to change the slant factor in the first version of the scale arose due to the transition from cursive handwriting to straight basic letters in the first literacy teaching in Turkey. Therefore, in this study, the slant factor adapted by Gök and Baş (2020) to straight basic letters was used. Scale factors are scored as completely adequate (3 points),

moderate (2 points), not at all sufficient (1 point). The lowest score that can be obtained on the scale is 5, and the highest score is 15. The legibility values of the scale are as in Table 2.

Table 2. Multidimensional Legibility Scale Values

Legibility level	Over the total score	Over each factor
Illegible	5 - 8,3 pts	1 - 1.66
Moderately legible	8.4 - 11.7 pts	1.67 - 2.32
Legible	11.8 - 15 pts	2.33 - 3

Within the scope of the study, the students were asked to write six sentences. Considering the grade level of the students, they were given six keywords to facilitate their writing and they were asked to write sentences about these words. The writings of the students were scored separately by the two researchers according to the *Multidimensional Legibility Scale*. To ensure rater reliability, 30% of the scores were scored separately by another researcher, and the inter-rater reliability between the raters was also calculated. According to this calculation, the Cronbach Alpha coefficient was found to be .96 and it was concluded that the scoring was reliable. The data set was created by adding the school starting age and gender status of the students to the scores obtained. The writing samples of the students and the assessment samples of the researchers are given in Figure 1 and Figure 2.

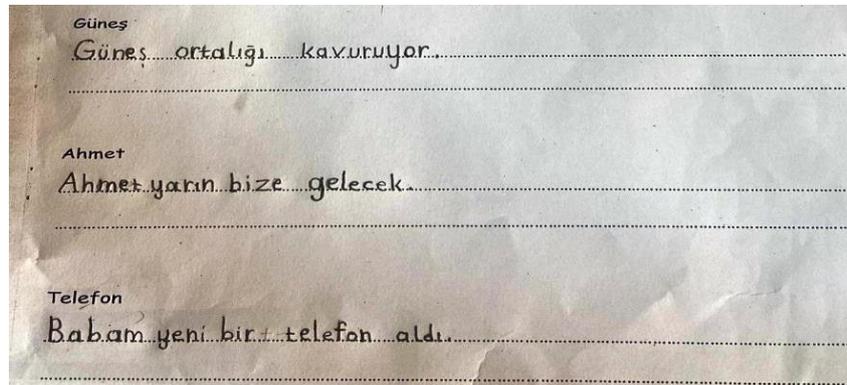


Figure 1. An example of legible handwriting

When the handwriting sample seen in Figure 1 was subjected to legibility analysis, it was rated as “legible,” with a total of 13 points in terms of slant (3), spacing (3 points), size (2 points), form (2 points) and line awareness (3 points).

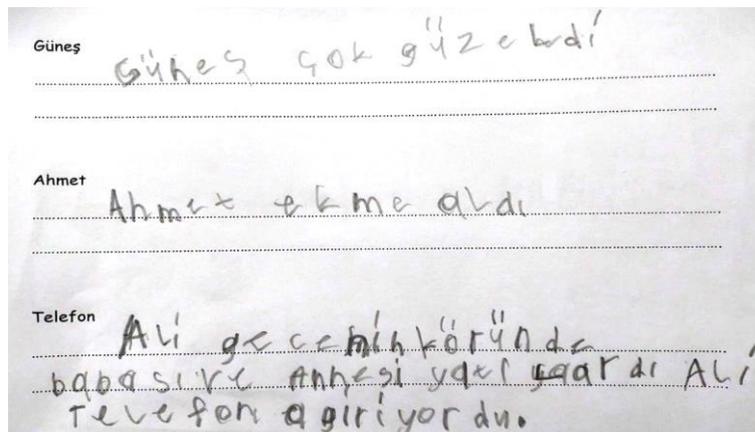


Figure 2. An example of illegible handwriting

Analyzing the handwriting sample shown in Figure 2, an illegible text gets a total of 5 points by adding slant (1 point), spacing (1 point), size (1 point), form (1 point), and line awareness (1 point) together.

Data Analysis

Package programs were used in the analysis of the data. The Kolmogorov-Smirnov test revealed that the data did not show normal distribution. As such, the non-parametric Mann-Whitney U test was used in the analysis of the data. In addition, the mean and standard deviation values for handwriting legibility were calculated over the sub-dimensions and the total score.

RESULTS

In this section, the results regarding the legibility of the first-grade primary school students' straight (non-cursive) handwritings are presented, which consist of the mean and standard deviation values of the text legibility of the sub-dimensions and total scores, followed by results regarding gender and school starting age. The descriptive assessment results regarding the sub-dimensions and the total score are given in Table 3.

Table 3. Handwriting Legibility Mean and Standard Deviation Scores

Legibility dimensions	n	\bar{x}	Ss	Legibility
Slant	513	1,79	.62	Moderately legible
Spacing	513	1,86	.70	Moderately legible
Size	513	1,92	.65	Moderately legible
Format	513	1,39	.58	Illegible
Line awareness	513	1,98	.60	Moderately legible
Total	513	8,95	2,53	Moderately legible

Looking at the table, we can see that the legibility of the handwriting is $\bar{x}=1.79$ in the slant dimension, $\bar{x}=1.86$ in the spacing dimension, $\bar{x}=1.92$ in the size dimension, $\bar{x}=1.39$ in the form dimension, $\bar{x}=1.98$ in the line awareness dimension, and $\bar{x}=8.95$ in the total score. According to the average scores, the slant, spacing, size, line awareness and the total score for legibility are moderate. However, the handwriting legibility in terms of 'form' is observed to be inadequate. Based on these results, the legibility of the first grade students' handwriting can be said to be moderate.

The assessment results regarding the sub-dimensions of handwriting legibility and the total score based on the gender of the students are presented in Table 4.

Table 4. Mann Whitney U Test Results on Handwriting Legibility by Gender

Dimension	Gender	n	Rank average	Rank total	U	p
Slant	Girl	247	272,32	67264,00	29066,00	.011
	Boy	266	242,77	64577,00		
Spacing	Girl	247	275,23	67981,00	28349,00	.003
	Boy	266	240,08	63860,00		
Size	Girl	247	266,70	65874,50	30455,00	.110
	Boy	266	247,99	65966,50		
Format	Girl	247	271,94	67170,00	29160,00	.008
	Boy	266	243,12	64671,00		
Line awareness	Girl	247	280,26	69223,50	27106,00	.000
	Boy	266	235,40	62617,50		
Total Score	Girl	247	283,05	69913,00	26417,00	.000
	Boy	266	232,81	61928,00		

As shown in the table, the scores obtained by the first grade students in the sub-dimensions of legibility, slant, spacing, form, line awareness, and the total of the scale differ significantly by gender,

while there is no significant gender-based difference in the ‘size’ sub-dimension. Examining the rank averages, the average score of girls is observed to be higher than those of the boys according to the sub-dimensions of slant, spacing, form, line awareness, and the total score. Accordingly, it can be said that the handwriting legibility of girls is higher than that of boys.

The results regarding the sub-dimensions of handwriting legibility and the total score of the students by the school starting age are given in Table 5.

Table 5. Mann Whitney U Test Results on Handwriting Legibility by School Starting Age

Dimension	Age	n	Rank average	Rank total	U	p
Slant	66-71 months	73	263,34	19224,00	15597,00	,655
	72+ months	440	255,95	112617,00		
Spacing	66-71+ months	73	270,08	19716,00	15105,00	,376
	72+ months	440	254,83	112125,00		
Size	66-71 months	73	273,57	19970,50	14850,50	,249
	72+ months	440	254,25	111870,50		
Form	66-71 months	73	266,32	19441,00	15380,00	,486
	72+ months	440	255,45	112400,00		
Line awareness	66-71 months	73	272,13	19865,50	14955,50	,271
	72+ months	440	254,49	111975,50		
Total score	66-71 months	73	274,38	20030,00	14791,00	,275
	72+ months	440	254,12	111811,00		

Looking at the table, it is seen that the scores of first grade students in the sub-dimensions of legibility of writing such as slant, spacing, size, form, line awareness, and the sum of the scale do not differ significantly by the school starting age. Thus, there is no statistically significant difference between the handwriting legibility of the students who start school in the 66-71 month period and of those who start school at 72 months or more.

DISCUSSION AND CONCLUSION

Focusing on the legibility of the first grade primary school students’ handwriting, this study revealed that the handwriting legibility of the students was moderate regarding the dimensions of slant, spacing, size, and line awareness, but not legible in terms of ‘form’. The highest performance was observed in the line-awareness dimension. These results are consistent with some previous research results reported in the literature (Gök & Baş, 2020; Kuşdemir, Katrancı & Arslan, 2018; Ulu, 2019). Gök and Baş (2020) determined that the students wrote legibly by all subdimension criteria, except for the ‘form’ subdimension, and they performed the best in ‘line awareness’. Based on the results of the current research and the literature, it can be said that the handwritings of the first grade students in primary school can be said to be legible, but they cannot write the letters correctly in terms of ‘form’. Such problems can be solved by writing exercises. The action research conducted by Ekmekçi and Kasa Ayten (2022) by going over letters, words, sentences and texts and visual dictation reported improvements in the writing skills of the students. The results of Yıldırım’s (2019) research based on the Montessori method recorded improvements in the legibility of the students’ handwriting as well. The results of the current study clearly show that writing activities based on different strategies, methods and techniques improve writing skills.

The results of the present study show that the handwriting legibility of girls is higher than that of boys. While these results are supported by some results in the literature (Kuşdemir, Katrancı, & Arslan, 2018), they contradict some others (Demiroğlu Memiş, 2018; Gök & Baş, 2020). Overall, results from the current study and those in the literature show that the average of handwriting legibility in terms of gender can sometimes be in favor of girls and sometimes boys, which can be argued to stem from the demographic characteristics of the participants included in the study.

Another result revealed by this study is that there is no statistically significant difference between the school starting age and handwriting legibility. In the related literature, no research could be found on the relationship between the school starting age and the legibility of handwriting. The only exception to this is the study conducted by Tural and Oral (2015), which found that the first

writing achievement of students aged 73 months and older was higher than those of students aged 60-66 months. This highlights the importance of the current study once again, as the results obtained here fill the gap in the relevant literature. It can be concluded that the age of starting school has no effect on the legibility of handwriting.

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