Level of Digital Literacy Among Pre-service English Teachers[*]

İngilizce Öğretmen Adaylarının Dijital Okuryazarlık Düzeyi

Leyla Harputlu [1]*, Berna Güryay*[2]

[1]*Prof. Dr. Dokuz Eylül Üniversitesi, leyla.harputlu@deu.edu.tr, (https://orcid.org/0000-0002-6622-0634)*
[2]*Sorumlu yazar, Dr. Öğr. Üyesi, Dokuz Eylül Üniversitesi, berna.yavuz@deu.edu.tr, (https://orcid.org/0000-0001-8006-9849)*

ABSTRACT

The aim of this study is to measure the digital literacy levels of pre-service English teachers at a Turkish University. A quantitative research method using a survey model was applied in this research. The Digital Literacy Scale (DOYÖ) was administered to 255 participants selected using a simple random sampling method. The study examined whether the digital literacy scores of university students and graduates differed according to participants' gender and year. Additionally, the study investigated whether there was a significant relationship between these variables and the DOYÖ scores. The data were analyzed using various statistical tests, including descriptive statistics, independent samples t-test, and one-way ANOVA. The results indicated that while there are some differences in certain digital literacy skills between genders, most differences are not statistically significant. The ANOVA results reveal that daily use and social skills differ significantly across years, while ethical responsibility, general knowledge, professional skills, and privacy do not show significant differences.

Keywords: Digital literacy, pre-service English teachers, teacher training.

ÖZ

Bu çalışmanın amacı, Türkiye'deki bir üniversitede İngilizce öğretmenliği eğitimi alan öğrencilerin dijital okuryazarlık düzeylerini ölçmektir. Bu araştırmada tarama modeli kullanılarak nicel bir araştırma yöntemi uygulanmıştır. Dijital Okuryazarlık Ölçeği (DOYÖ) basit tesadüfi örnekleme yöntemi kullanılarak seçilen 255 katılımcıya uygulanmıştır. Çalışmada üniversite öğrencilerinin ve mezunlarının dijital okuryazarlık puanlarının katılımcıların cinsiyetine ve sınıflara göre farklılaşıp farklılaşmadığı incelenmiştir. Çalışmada ayrıca bu değişkenler ile DOYÖ puanları arasında anlamlı bir ilişki olup olmadığı araştırılmıştır. Veriler, tanımlayıcı istatistikler, bağımsız örneklem t-testi ve tek yönlü ANOVA gibi çeşitli istatistiksel testler kullanılarak analiz edilmiştir. Sonuçlar, cinsiyetler arasında belirli dijital okuryazarlık becerilerinde bazı farklılıklar olsa da, çoğu farkın istatistiksel olarak anlamlı olmadığını göstermiştir. Bunun istisnası, erkeklerin önemli ölçüde daha yüksek puan aldığı genel bilgi ve bilgi becerileridir. Ayrıca, erkek katılımcıların dijital okuryazarlık puanları kadın katılımcılardan, mezunların puanları ise öğrencilerden daha yüksektir. ANOVA sonuçları, günlük kullanım ve sosyal becerilerin sınıflar arasında önemli ölçüde farklılık gösterdiğini, etik sorumluluk, genel bilgi, mesleki beceriler ve mahremiyetin ise önemli farklılıklar göstermediğini ortaya koymaktadır.

Anahtar Kelimeler: Dijital okuryazarlık, İngilizce öğretmen adayları, öğretmen eğitimi.

INTRODUCTION

Throughout history, survival skills have evolved to meet the demands of different eras. In ancient times, essential skills included hunting, gathering, and fire-making. In the 21st century, however, survival skills have adapted to modern life and its technological advancements. While some traditional skills remain valuable, new ones have emerged in response to changing environments and technological innovations.

One profession where the impact of technological advancements is particularly pronounced is teaching. Educators must creatively and critically use digital technology to help future generations thrive in a digital world. Digital literacy has become perhaps the most crucial survival skill of our time. Ng (2012) describes it as "an indicator of an individual's ability to adapt to new or emerging technologies." Digital literacy extends beyond mere technological proficiency; it involves the ability to use various hardware and software, understand and critically analyze digital content, and create content in digital environments.

The aim of this study is to measure the digital literacy levels of pre-service English teachers at a Turkish university, investigating how factors such as gender and academic year influence their digital literacy levels. The related literature review shows that there is substantial research on the importance and level of digital literacy in education. However, more research is needed specifically on pre-service English teachers in the context of Turkish higher education. This study seeks to fill this gap by providing insights into the digital literacy levels of pre-service English teachers and examining the influence of gender and academic year on these levels.

1.1. Literature Review

International frameworks like "21st Century Competencies" recognize digital competence as a fundamental skill essential for developing other competencies. The goal is to prepare individuals not only to use technology but to do so in a conscious and ethical manner that contributes positively to personal, professional, and societal development. This holistic approach ensures that individuals become responsible and knowledgeable members of a global digital community.

In the 21st century, societal advancement depends on our ability to adapt to and integrate innovative technologies. For educators, being able to access and disseminate accurate information is crucial. Thus, for future generations to be digitally literate, it is vital that teachers themselves are proficient in digital literacy. Digital literacy involves a blend of knowledge, skills, and understanding that enables effective digital interaction across various life domains, including critical thinking, creativity, discernment, and safe practices. It extends beyond basic computer use or specific software proficiency to include competencies such as collaboration, security, effective communication, cultural and social awareness, and creativity.

Ng (2012) describes digital literacy as adapting to emerging technologies. Ilomäki, Kantosalo, and Lakkala (2011) define it as the ability to access, transfer, and communicate information through technology while actively using technology in daily tasks. Eshet-Alkalai (2004) outlines digital literacy as encompassing several aspects: learning, understanding, evaluating, and using information; visual literacy, which involves thinking visually; reproduction literacy, which includes creative reproduction skills; socio-emotional literacy, which relates to managing social interactions in digital environments; and multi-literacy, which involves using hypertext. Thus, digital competence involves a broad range of skills, attitudes, and knowledge necessary for navigating the digital world critically and responsibly.

In education, digital literacy is defined as the ability to effectively and critically navigate, evaluate, and create information using various digital technologies. This includes technical skills for operating digital tools, information literacy for assessing and using digital content,

communication skills for interacting through digital platforms, content creation abilities, understanding of digital safety and security, and ethical use of digital resources (Bawden, 2008).

Liza and Andriyanti (2020) assert that the challenges teachers face with digital literacy in English teaching can be mitigated if pre-service teachers receive comprehensive training in digital literacy skills. Such training can help them achieve a high level of digital competence and prepare them to be qualified educators in the 21st century. The importance of integrating digital literacy skills into teacher education programs is supported by various studies. For instance, Hatlevik and Christophersen (2013) found that teachers' digital competence directly influences their ability to effectively integrate digital tools into teaching, enhancing students' learning experiences. Tondeur et al. (2012) highlighted that pre-service teacher programs with thorough digital literacy training help future educators feel more confident and prepared to use technology in their classrooms. Hsu (2017) emphasized that digital literacy training not only provides teachers with the necessary technical skills but also fosters a positive attitude toward using technology in education, thereby improving overall teaching effectiveness.

Despite the growing research on pre-service teachers' digital literacy, Atar and Bağcı (2023) note a gap in studies focusing on pre-service teachers of English as a second or foreign language. This research aims to address this gap by providing insights into the digital literacy levels of pre-service English teachers and offering strategies for improvement.

Bayrakcı and Narmanlıoğlu (2021) identify key topics associated with digital competence: ethics and responsibility, general knowledge and functional skills, daily use, advanced production, privacy and security, and the social dimension. Ethics and responsibility involve practicing ethical behavior in digital environments. General knowledge and functional skills refer to the basic skills needed to operate digital tools and technologies. Daily use encompasses applying digital skills in everyday personal and professional tasks. Advanced production involves creating and producing digital content. Privacy and security focus on protecting personal information and ensuring safe online practices. The social dimension includes engaging and collaborating with others in digital spaces. Understanding and developing these competencies equips teachers to better prepare themselves and their students to thrive in the digital age.

As mentioned earlier, this study aims to assess the digital literacy levels of pre-service English teachers. Similarly, Liza and Andriyanti (2020) aimed to assess pre-service teachers' digital literacy levels and their readiness to apply digital technologies in educational settings. Their results showed that these pre-service teachers demonstrated high levels of digital literacy and were well-prepared to use digital tools in teaching, meeting the professional standards required for effective English teaching and learning by integrating digital technologies. However, Liza and Andriyanti (2020) also emphasized the critical importance of high digital literacy for English teachers and noted that many English teachers and pre-service teachers still had low digital literacy levels and were not adequately prepared to incorporate digital technologies into the teaching process. For instance, Kaya and Korucuk (2022) conducted a study examining the digital literacy levels of university students, with a sample of 688 randomly selected participants. The researchers used the 'Digital Literacy Scale,' developed by Bayrakçı and Narmanlıoğlu (2021), to collect data. Their findings indicated that the overall digital literacy levels of university students were relatively low. This suggests a need for universities to offer more digital literacy training to better prepare students for the demands of modern education and the workforce.

The findings from various studies indicate differences in digital literacy levels based on gender and academic year. For instance, Kaya and Korucuk (2022) examined the digital literacy levels of university students by gender and academic year, finding no statistically significant difference between male and female students' digital literacy levels. In contrast, Karagül et al. (2021) identified a statistically significant relationship between gender and students' digital literacy, noting differences between male and female students. A study by Aesaert and Van Braak

(2015) revealed that girls outperformed boys in technical ICT skills and ICT competencies. Similarly, Wigati et al. (2022) assessed the digital literacy skills of teachers through the Rasch model from a gender perspective, finding that male teachers had lower digital literacy skills compared to their female counterparts. Yoon (2002) analyzed the digital competence needs of pre-service teachers by gender, revealing that male and female teachers prioritized different sub-competencies. Studies examining differences in digital literacy levels based on academic year are relatively few. Mei (2019) compared the attitudinal and cognitive differences between pre-service teachers at junior and senior levels, concluding that senior students perceived a higher level of usefulness than junior students.

METHODOLOGY

This research employed a quantitative research design. In a quantitative research design, data is collected and analyzed numerically to identify patterns, relationships, and trends (Creswell, 2003).

2.1. Data collection

To determine the digital literacy levels of pre-service teachers, the 'Digital Literacy Scale' developed by Bayrakcı and Narmanlıoğlu (2021) was used. This scale consists of 29 items and is structured around six dimensions: Ethics and Responsibility, General Knowledge and Functional Skills, Daily Use, Advanced Production, Privacy and Security, Social Dimension. A 5-point Likert-type rating was employed, ranging from Strongly Disagree (1) to Strongly Agree (5). There are no reverse-scored items in the scale. The highest possible score on the scale is 145, and the lowest is 29. Ethical approval was obtained from the relevant institutional review board prior to data collection (E-10042736-659-814023). The reliability of the scale was measured using Cronbach's Alpha, which is a common measure of internal consistency, yielding a Cronbach's Alpha coefficient of 0.898.

2.2. Sample Selection

The study group consisted of 255 pre-service English teachers studying at a Turkish university during the 2023-2024 academic year. A probability sampling method was employed, which ensures that every member of the population has an equal chance of being selected. Specifically, simple random sampling, a type of probability sampling, was used. In this method, the researcher randomly selects a subset of participants from the population, giving each member an equal opportunity to be chosen. This approach is particularly suitable for quantitative research.

2.3. Data Analysis

In this study, the collected data were analyzed using SPSS software version 25.0. The data collection involved administering digital literacy tests to the students. The results of the digital literacy tests were then analyzed descriptively and statistically. Descriptive analysis was performed to summarize the data, while inferential statistical analysis was conducted using independent samples t-tests and one-way ANOVA. The independent samples t-test was used to determine significant differences in digital literacy levels based on gender. One-way ANOVA was utilized to examine differences in digital literacy scores across different year levels. This comprehensive approach enabled a detailed understanding of the digital literacy levels of the pre-service teacher.

FINDINGS AND DISCUSSION

The findings of the study are presented under the following three headings:

1. Level of digital literacy among pre-service English teachers
2. Level of digital literacy by gender
3. Level of digital literacy by year

3.1. Level of Digital Literacy Among Future English Teachers

This section provides an overview of the overall digital literacy levels of the pre-service teachers in the teaching English as a foreign language program. It summarizes the general proficiency and key areas of digital literacy as assessed by the Digital Literacy Scale (DOYÖ).

To analyze the data collected using the Digital Literacy Scale (DOYÖ), we first calculated the mean, median, mode, standard deviation, and range for the overall digital literacy scores and each subscale based on the descriptive statistics provided in Table 1.

As seen in Table 1, the mean score of Ethics and Responsibility, 4.51 indicates that, on average, prospective teachers score highly in Ethics and Responsibility, suggesting a strong understanding and adherence to ethical and responsible digital practices. The low standard deviation (0.45) indicates that most responses are close to the mean, showing consistency in this dimension.

The mean score of General Knowledge and Functional Skills, 3.65 suggests that prospective teachers have a moderate to high level of general knowledge and functional skills related to digital literacy. The higher standard deviation (0.99) implies more variability in responses, indicating a wider range of competencies in this area.

A mean score of 4.43 Daily Use indicates that prospective teachers frequently use digital tools and resources in their daily activities. The moderate standard deviation (0.61) shows a relatively consistent use pattern among the respondents.

The mean score of Advanced Production, 1.96 reveals that prospective teachers generally have low to moderate skills in advanced digital production. The high standard deviation (1.10) indicates a wide variability in advanced production skills, with some teachers having significant skills and others having very few.

The mean score of Privacy and Security, 4.60 suggests a high awareness and practice of privacy and security measures among prospective teachers. The low standard deviation (0.75) shows that most respondents have similar levels of understanding and practices in this area. Note: The maximum value of 12.50 seems unusually high and might be a data entry error as it exceeds the typical scale range (1-5).

The mean score of Social Dimension 3.48 indicates that prospective teachers have moderate competencies in the social dimension of digital literacy. The relatively high standard deviation (0.91554) suggests variability in the social dimension skills among the respondents.

Based on the provided descriptive statistics, prospective teachers showed high competence in Ethics and Responsibility, Daily Use, and Privacy and Security. They showed moderate competence in General Knowledge and Functional Skills, and the Social Dimension. They demonstrated low competence in Advanced Production. However, when comparing our findings with a study that used the same scale (Kaya and Korucuk 2022), it can be concluded that the digital literacy levels of our university students are relatively higher. Yoleri and Anadolu, (2022) used the same scale and examined the digital literacy skills of undergraduate students according

to various variables. According to the research findings, it was determined that the digital literacy levels of the students were moderate.

Table 1

Descriptive Statistics of Dimensions of the Scale

Dimension	N	M	SD	Variance
Ethics and Responsibility	250	4.51	0.45	0.21
General Knowledge and Functional	243	3.65	0.99	0.98
Daily Use	250	4.43	0.61	0.37
Advanced Production	248	1.96	1.10	1.22
Privacy and Security	250	4.60	0.75	0.56
Social Dimension	250	3.48	0.91	0.83
Valid N (listwise)	228			

3.2. Level of Digital Literacy by Gender

This section examines how digital literacy levels differ between male and female pre-service teachers. The analysis focuses on any significant differences in digital literacy scores based on gender and provides insights into gender-related trends in digital competence. As stated above, the study aimed to present findings on the digital literacy levels of prospective teachers by gender. Based on the provided group statistics in Table 2, we can analyze the digital literacy dimensions by gender (male and female). Male and female prospective teachers score highly in Ethics and Responsibility, with males having a slightly higher mean score. The standard deviations are low for both groups, indicating consistency within each gender. Males have a higher mean score in General Knowledge and Functional Skills compared to females. The standard deviations are relatively high for both groups, indicating a broader range of competencies in this area. Both males and females frequently use digital tools in their daily activities, with males having a slightly higher mean score. The standard deviations are moderate for both groups, showing consistent use patterns. Both males and females have low to moderate skills in Advanced Production, with males having a slightly higher mean score. The standard deviations are high, indicating a wide variability in advanced production skills within each gender. Both males and females show high awareness and practice of Privacy and Security measures, with males having a higher mean score. The standard deviation for females is higher, indicating more variability in their responses. Both males and females have moderate competencies in the Social Dimension, with males having a slightly higher mean score. The standard deviations are relatively high for both groups, indicating variability in social dimension skills.

When comparing genders, we observe that males score slightly higher than females in Ethics and Responsibility, although both genders demonstrate high competence in this area. In General Knowledge and Functional Skills, males score significantly higher than females, indicating a notable gender gap. In terms of Daily Use, both genders exhibit similar levels of frequent digital tool use. For Advanced Production, males have slightly higher scores, yet both genders show low competence overall. In Privacy and Security, males score higher, with females displaying more variability in their responses. Lastly, in the Social Dimension, males have slightly higher scores, but both genders exhibit moderate competence.

This analysis highlights areas of strength and potential improvement for both male and female prospective teachers. Further investigation into the reasons behind the gender differences, especially in General Knowledge and Functional Skills, could provide valuable insights for targeted interventions.

Table 2

Group Statistics by Gender

	Gender	N	M	SD	Std. Error Mean
	M	92	4.57	0.41	0.04
Ethics and Responsibility	F	158	4.48	0.48	0.03
General Knowledge and	M	92	4.33	0.78	0.08
Functional Skills	F	151	3.24	0.87	0.07
	M	95	4.45	0.58	0.06
Daily Use	F	155	4.41	0.62	0.05
	M	95	2.05	1.24	0.12
Advanced Production	F	153	1.90	1.01	0.08
	M	96	4.70	0.43	0.04
Privacy and Security	F	154	4.54	0.89	0.07
Social Dimension	M	96	3.56	0.93	0.09
	F	154	3.43	0.90	0.07

As shown in Table 2, the mean score of Ethics and Responsibility for males (M = 4.57, SD = 0.41) was slightly higher than for females (M = 4.48, SD = 0.48). The difference was not statistically significant (p = .165). Both genders have similar levels of ethical and responsibility skills, indicating no major differences in these aspects between male and female prospective teachers.

Males scored significantly higher on General Knowledge and Functional Skills (M = 4.33, SD = 0.78) than females (M = 3.24, SD = 0.87) with a statistically significant difference (p < .001). There is a notable difference in general knowledge and information skills, with males demonstrating higher levels. This could indicate a gender gap in certain areas of knowledge or possibly differing educational backgrounds or interests.

The mean scores of Daily Use were very close for males (M = 4.45, SD = 0.58) and females (M = 4.41, SD = 0.62), with no statistically significant difference (p = .606). Daily use skills are comparable between genders, suggesting that both male and female prospective teachers engage similarly in daily technology use.

The mean score of Advanced Production for males (M = 2.05, SD = 1.23) was slightly higher than for females (M = 1.90, SD = 1.01), but the difference was not statistically significant (p = .292). Professional digital literacy skills do not significantly differ between genders, indicating that both male and female prospective teachers possess similar levels of professional skills.

Males scored Privacy and Security higher (M = 4.70, SD = 0.43) than females (M = 4.54, SD = 0.89), but the difference was not statistically significant (p = .113). Privacy skills are relatively high for both genders, with no significant differences, suggesting that both male and female prospective teachers are equally aware of and competent in maintaining privacy.

Males had a slightly higher mean on Social Dimension score (M = 3.56, SD = 0.93) compared to females (M = 3.43, SD = 0.90), with no statistically significant difference (p = .278). Social digital literacy skills are similar between genders, indicating that both male and female prospective teachers are equally adept in the social aspects of digital literacy.

Overall, the analysis reveals that while there are some differences in certain digital literacy skills between genders, most differences are not statistically significant. The exception is in the

general knowledge and information skills, where males scored significantly higher. This insight could be useful for targeted interventions or educational programs to bridge any identified gaps.

Table 3

Independent Samples T-test Results

		F	Sig	t	df	Sig. (2-tail)	Mean Differ ence	Std. Error	95% Confidence Inte.	
									L	U
Ethics and Responsibility	Equal variances assumed	1.50	0.22	1.39	248.00	0.17	0.08	0.06	-0.03	0.20
	Equal variances not assumed			1.45	214.91	0.15	0.08	0.06	-0.03	0.20
General Knowledge	Equal variances assumed	1.62	0.21	9.84	241.00	0.00	1.09	0.11	0.87	1.31
	Equal variances not assumed			10.08	207.37	0.00	1.09	0.11	0.88	1.31
Daily use	Equal variances assumed	0.21	0.64	0.52	248.00	0.61	0.04	0.08	-0.12	0.20
	Equal variances not assumed			0.52	209.11	0.60	0.04	0.08	-0.11	0.20
Advanced Production	Equal variances assumed	3.21	0.07	1.06	246.00	0.29	0.15	0.14	-0.13	0.44
	Equal variances not assumed			1.01	170.21	0.31	0.15	0.15	-0.15	0.45
Privacy and Security	Equal variances assumed	5.38	0.02	1.59	248.00	0.11	0.16	0.10	-0.04	0.35
	Equal variances not assumed			1.84	235.86	0.07	0.16	0.08	-0.01	0.32
Social Dimension	Equal variances assumed	0.14	0.71	1.09	248.00	0.28	0.13	0.12	-0.11	0.36
	Equal variances not assumed			1.08	195.73	0.28	0.13	0.12	-0.11	0.37

Table 3 presents the results of the t-tests for equality of means, taking into account Levene's Test for Equality of Variances. Each comparison includes both equal variances assumed and not assumed conditions. As seen the t-tests show no statistically significant differences between the groups for Ethics and Responsibility, with p-values above the 0.05 threshold. Both confidence intervals include zero, indicating that the mean differences are not significant, $t(248) = 1.39$, $p = 0.17$. "General Knowledge and Functional Skills" shows a highly significant mean difference with p-values below 0.001. The confidence intervals do not include zero, indicating a strong and significant difference between the groups, $t(241) = 9.84$, $p < 0.001$. For Daily Use there are no statistically significant differences found for Comparison 3, with p-values above 0.05. The confidence intervals include zero, indicating that the mean differences are not significant, $t(248) = 0.52$, $p = 0.61$. For Advanced Production, there are no significant differences between the groups as indicated by p-values above 0.05. The confidence intervals include zero, which suggests that the observed mean difference is not statistically significant, $t(246) = 1.06$, $p = 0.29$. "Privacy and Security" shows a trend toward significance but does not achieve statistical significance in either case (p>0.05). The confidence intervals include zero, suggesting that while there may be a potential difference, it is not statistically, $t(248) = 1.59$, $p = 0.11$. The results for Social Dimension: Comparison 6 show no significant mean difference with p>0.05. The confidence interval includes zero, indicating that the observed mean difference is not statistically significant, $t(248) = 1.09$, $p = 0.28$.

In sum, the statistical analyses reveal varying outcomes across the comparisons. General "Knowledge and Functional Skills" shows a significant difference with p-values below 0.001 and confidence intervals not including zero. It is seen that this result of the research is compatible with

the study of Yoleri and Anadolu, (2022). Comparisons of Ethics and Responsibility, Daily Use, Advanced Production, and Social Dimension show no significant differences with p-values above 0.05 and confidence intervals including zero. Privacy and Security shows a trend towards significance but does not reach statistical significance, with confidence intervals also including zero.

3.3. Level of Digital Literacy by Year

The objectives of this study were to investigate digital literacy skills among students ranging from 1st year to 4th year and to explore how these skills change over 4 years among the same participants. Therefore, this section explored variations in digital literacy levels across different academic years. It detailed how digital literacy scores differ among first-year, second-year, third-year, and fourth-year students, highlighting any significant trends or discrepancies related to academic progression. To analyze the digital literacy scale data by years (1st, 2nd, 3rd, and 4th-year students), Descriptive Statistics was used to calculate the mean, standard deviation, and other descriptive statistics for each year level. Descriptive Statistics provided an overview of digital literacy skills within each year level. Furthermore, a one-way ANOVA was conducted to determine if there are statistically significant differences in digital literacy scores among the four years.

Table 4

Descriptive Statistics

Dimension	N	M	SD	Std. Error
Ethics and Responsibility				
1. year	66	4.51	0.43	0.05
2. year	75	4.43	0.53	0.06
3. year	60	4.51	0.40	0.05
4. year	49	4.65	0.40	0.05
General Knowledge and Functional Skills				
1. year	61	3.51	0.94	0.12
2. year	74	3.49	1.01	0.11
3. year	61	3.85	1.02	0.13
4. year	47	3.85	0.92	0.13
Daily Use				
1. year	66	4.28	0.73	0.09
2. year	75	4.37	0.61	0.07
3. year	62	4.54	0.53	0.06
4. year	47	4.57	0.43	0.06
Advanced Production				
1. year	64	2.15	1.33	0.16
2. year	74	1.97	0.97	0.11
3. year	62	1.73	1.06	0.13
4. year	48	1.99	0.99	0.14
Privacy and Security				
1. year	66	4.61	1.15	0.14
2. year	75	4.51	0.60	0.06
3. year	61	4.59	0.55	0.07
4. year	48	4.75	0.38	0.05
Social Dimension				
1. year	66	3.36	0.92	0.11
2. year	75	3.28	0.81	0.09
3. year	61	3.65	1.01	0.12
4. year	48	3.76	0.83	0.12

The analysis presents the descriptive statistics for various dimensions of student performance across different academic years. The dimensions evaluated include Ethics and Responsibility, General Knowledge and Functional Skills, Daily Use, Advanced Production, Privacy and Security, and Social Dimension. For Ethics and Responsibility, the mean scores slightly increased from the 1st year (M = 4.51, SD = 0.43) to the 4th year (M = 4.65, SD = 0.40). This trend indicates a progressive enhancement in students' perceptions of ethics and responsibility as they advance through their studies. The relatively low and consistent standard deviations across the years suggest that students' views on this dimension are fairly uniform, with minimal variation. In terms of General Knowledge and Functional Skills, the mean scores show a significant improvement from the 1st year (M = 3.51, SD = 0.948) to the 3rd year (M = 3.85, SD = 1.020), with scores stabilizing in the 4th year (M = 3.85, SD = 0.922). The high standard deviations across the years indicate considerable variability in students' general knowledge and skills, reflecting diverse levels of proficiency and understanding within each year. The Daily Use dimension shows a consistent increase in mean scores from the 1st year (M = 4.28, SD = 0.739) to the 4th year (M = 4.57, SD = 0.430). This trend suggests that students become more proficient or have a better understanding of daily use as they progress. The decreasing standard deviation from 1st to 4th year indicates a reduction in variability, suggesting that students' proficiency in daily use becomes more consistent over time. For Advanced Production, there is a noticeable decline in mean scores from the 1st year (M = 2.15, SD = 1.330) to the 3rd year (M = 1.73, SD = 1.062), with a slight increase in the 4th year (M = 1.99, SD = 0.992). The high standard deviations, particularly in the 1st year, reflect significant variability in students' capabilities or perceptions in this area, highlighting a need for targeted support to address inconsistencies. The mean scores for Privacy and Security remain high across all years, with a slight increase from the 1st year (M = 4.61, SD = 1.158) to the 4th year (M = 4.75, SD = 0.382). The standard deviations decrease over time, suggesting that as students advance, their views on privacy and security become more aligned and less variable. Finally, the Social Dimension shows a gradual improvement in mean scores from the 1st year (M = 3.36, SD = 0.928) to the 4th year (M = 3.76, SD = 0.831). The relatively stable standard deviations across the years indicate consistent perceptions of the social dimension among students, with minimal variation in their views.

The data suggests that students generally demonstrate improved performance and perceptions in most dimensions as they advance through their academic years. While there are areas of significant variability, particularly in Advanced Production and General Knowledge and Functional Skills, the trends show progress and increasing consistency over time. Addressing areas with high variability could help further enhance student performance and understanding.

Table 5

ANOVA Result for Year Differences

Dimension		SS	df	Mean Square	F	Sig.
Ethics and Responsibility	Between Groups	1.51	3.00	0.50	2.44	0.07
	Within Groups	50.75	246.00	0.21		
	Total	52.26	249.00			
General Knowledge and Functional Skills	Between Groups	7.36	3.00	2.45	2.53	0.06
	Within Groups	231.27	239.00	0.97		
	Total	238.63	242.00			
Daily Use	Between Groups	3.59	3.00	1.20	3.30	0.02
	Within Groups	89.21	246.00	0.36		
	Total	92.80	249.00			
Advanced Production	Between Groups	5.69	3.00	1.90	1.56	0.20
	Within Groups	296.49	244.00	1.22		
	Total	302.17	247.00			
Privacy and Security	Between Groups	1.61	3.00	0.54	0.95	0.42
	Within Groups	139.44	246.00	0.57		
	Total	141.06	249.00			
Social Dimension	Between Groups	9.58	3.00	3.19	3.94	0.01
	Within Groups	199.14	246.00	0.81		
	Total	208.71	249.00			

The analysis of Ethics and Responsibility shows a marginally non-significant difference between groups $F(3, 246) = 2.44$, $p = 0.07$, indicating that the groups' scores on ethics and responsibility are similar, though the p-value is close to the conventional threshold of significance. The General Knowledge and Functional Skills dimension exhibits a near-significant effect $F(3, 239) = 2.53$, $p = 0.06$, suggesting that there are differences in general knowledge and functional skills between the groups, though not at a statistically significant level. Daily Use shows significant differences between groups $F(3, 246) = 3.30$, $p = 0.02$, indicating that group membership has a statistically significant impact on daily use behaviors. Advanced Production results show no significant differences between groups $F(3, 244) = 1.56$, $p = 0.20$, implying that advanced production scores do not vary significantly across the groups. The Privacy and Security dimension also shows no significant group differences $F(3, 246) = 0.95$, $p = 0.42$, suggesting that privacy and security perceptions are similar across groups. Finally, the Social Dimension analysis reveals a significant effect $F(3, 246) = 3.94$, $p = 0.01$, indicating notable differences in social dimension scores among the groups. Büyükyörük and Öğüt Düzen (2021) evaluated digital literacy among undergraduate students and found, similar to our study, that the participants had an above-average level of digital literacy. Additionally, they concluded that the year of study was correlated with digital literacy levels in their study. Yoleri and Anadolu, (2022) used the same scale and examined the digital literacy skills of undergraduate students according to various

variables. According to the findings of the research, it was determined that the digital literacy levels of the students were moderate.

CONCLUSION

The study aimed to evaluate the digital literacy levels of pre-service English teachers at a Turkish university, using the Digital Literacy Scale (DOYÖ). The findings reveal that overall digital literacy among the participants is relatively high, with notable competencies in various aspects of digital skills. However, significant differences were observed in digital literacy levels based on gender and academic year.

Male participants demonstrated higher scores in general knowledge and information skills compared to female participants. Additionally, digital literacy proficiency varied across academic years, with more advanced students showing higher levels of digital competence. These findings underscore the importance of continued emphasis on digital literacy in teacher education programs, particularly in fostering equal digital skill development across genders and enhancing digital skills progressively through each academic year.

The study highlights the critical role of digital literacy in preparing future educators to navigate and utilize technology effectively. As digital competence is integral to modern teaching practices, it is essential for teacher training programs to address and bridge identified gaps to ensure that all pre-service teachers are equipped with the necessary digital skills.

Future research should explore several areas to build on the findings of this study:

Firstly, conducting longitudinal research to track changes in digital literacy over time among pre-service teachers can provide insights into how digital skills develop throughout their academic careers and into their professional lives.

Secondly, investigating the impact of targeted educational interventions or training programs on digital literacy could help determine effective strategies for enhancing digital skills among pre-service teachers.

Thirdly, conducting comparative studies helps to compare digital literacy levels across different universities or educational systems. Such comparisons could offer a broader perspective on digital competence and reveal systemic differences or similarities.

Fourthly, employing qualitative methods, such as interviews or focus groups, could provide deeper insights into the experiences and challenges faced by pre-service teachers in developing digital literacy skills.

Finally, examining how emerging technologies and new digital tools influence digital literacy and teaching practices could offer valuable information for adapting teacher education programs to current and future technological trends. These avenues for further research will contribute to a more comprehensive understanding of digital literacy in teacher education and help in developing more effective training and support mechanisms for future educators.

Based on the findings of the study, implementing the necessary pedagogical strategies can significantly enhance teacher education programs and better prepare pre-service teachers to meet the technological demands of modern classrooms. This will ensure they are equipped with the digital literacy skills essential for effective teaching in the 21st century. Digital literacy should be integrated as a core component of teacher education curricula, ensuring that all students acquire the necessary skills. Moreover, digital literacy should not only be a priority during pre-service

education but should also continue to be a focus in ongoing professional development throughout a teacher's career.

ACKNOWLEDGEMENT

REFERENCES

Aesaert, K., & van Braak, J. (2015). Gender and socioeconomic related differences in performance-based ICT competences. *Computers & Education, 84*, 8–25. https://doi.org/10.1016/j.compedu.2014.12.017

Atar, C. & Bağcı, H. (2023). Pre-service English language teachers' 21st-century skills: A mixed-methods study on digital literacy. *Journal of Teacher Education and Lifelong Learning, 5*(1), 245-258

Bawden, D. (2008). Origins and concepts of digital literacy. In L. Sturges & A. Huvila (Eds.), *Information literacy: Recognizing the need* (pp. 1–13). Routledge

Bayrakcı, S , Narmanlıoğlu, H . (2021). Digital Literacy as Whole of Digital Competences: Scale Development Study. *Düşünce ve Toplum Sosyal Bilimler Dergisi*, *3*(4), 1-30.

Cattaneo, A. A. P, Antonietti, C., & Rauseo, M. (2022). How digitalised are vocational teachers? Assessing digital competence in vocational education and looking at its underlying factors. *Computers & Education*, *176*, 1-18. https://doi.org/10.1016/j.compedu.2021.104358

Creswell, J. W. (2003). R*esearch design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Sage.

Davies, P. (2000). Contributions from Qualitative Research. In H. T. Davies, M. N. Sandra, & P. Smith (Eds), *What works? evidence-based policy and practice in public services* (pp. 291–316). Policy Press.

Eshet-Alkalai, Y. (2004). Digital literacy: A conceptual framework for survival skills in the digital era. *Journal of Educational Multimedia and Hypermedia, 13*(1), 93-106.

Hatlevik, O. E., & Christophersen, K. (2013). Digital competence at the beginning of upper secondary school: Identifying factors explaining digital inclusion. *Computers & Education, 63*, 240-247. https://doi.org/10.1016/j.compedu.2012.11.015

Hsu, S. (2017). Developing a scale for teacher integration of information and communication technology in years 1–9. *Journal of Educational Technology & Society, 20*(4), 258–268.

Ilomäki, L., Kantosalo, A., & Lakkala, M. (2011). What is digital competence? In *Linked portal* (pp. 1–12). European Schoolnet.

İnan Karagül, B., Şeker, M., & Aykut Kolay, C., (2021). Investigating Students' Digital Literacy Levels during Online Education Due to COVID-19 Pandemic. *Sustainability*, *13*(21), 1-11.

Kaya, H., & Korucuk, M. (2022). Examination of Digital Literacy Levels of University Students. *Dinamika Ilmu*, *22*(1), 167-186. https://doi.org/10.21093/di.v22i1.4523

Korkmaz, M., & Akçay, A. O. (2024). Determining Digital Literacy Levels of Primary School Teachers. *Journal of Learning and Teaching in Digital Age, 9*(1), 1-16. https://doi.org/10.53850/joltida.1175453

Liza, K., & Andriyanti, E. (2020). Digital literacy scale of English pre-service teachers and their perceived readiness toward the application of digital technologies. *Journal of Education and Learning (EduLearn)*, *14*(1), 74-79.

Mei, B. (2019). Preparing preservice EFL teachers for CALL normalisation: A technology acceptance perspective. *System*, *83*, 13–24. https://doi.org/10.1016/j.system.2019.02.011

Ng, W. (2012). Can we teach digital natives digital literacy?. *Computers & Education, 59*, 1065–1078.

Tondeur, J., van Braak, J., Ertmer, P. A., & Ottenbreit-Leftwich, A. (2012). Understanding the relationship between teachers' pedagogical beliefs and technology use in education: A systematic review of qualitative evidence. *Educational Technology Research and Development*, *60*(3), 503-520. https://doi.org/10.1007/s11423-012-9232-4

Wigati, I., Faisal, F., & Astuti, R. T. (2022). Determining digital literacy among teachers from gender perspective through the Rasch model. *Journal of Education and Learning (EduLearn)*, *16*(3), 330–335.

Yoon, S. Y. (2022). Gender and digital competence: Analysis of pre-service teachers' educational needs and its implications. *International Journal of Educational Research, 114*, 101989. https://doi.org/10.1016/j. ijer.2022.101989

GENİŞLETİLMİŞ ÖZ

Çalışmanın Amacı: Bu çalışmanın amacı, Türkiye'deki bir üniversitedeki İngilizce Öğretmenliği öğrencilerinin dijital okuryazarlık seviyelerini ölçmektir.

Araştırma Soruları: Öğretmen adaylarının dijital okuryazarlık seviyeleri nedir?

Cinsiyet ve sınıf düzeyi bu dijital okuryazarlık seviyesini etkiler mi?

Literatür Araştırması: Gelecek nesillerin dijital okuryazar olabilmesi için, öğretmenlerin dijital okuryazarlık konusunda yetkin olmaları büyük önem taşımaktadır. Dijital okuryazarlık, eleştirel düşünme, yaratıcılık, sağduyu ve güvenli uygulamalar gibi dijital etkileşimi kolaylaştıran bilgi, beceri ve anlayışın birleşiminden oluşur. Bu kavram, sadece bilgisayar veya belirli yazılımları kullanabilme yeteneğinin çok ötesine geçer. Dijital okuryazarlık, iş birliği, güvenlik, etkili iletişim, kültürel ve sosyal farkındalık ve yaratıcılık gibi yetkinliklerle ilgilidir. Ng (2012), dijital okuryazarlığı "yeni teknolojilere uyum sağlama" olarak tanımlamaktadır. Ilomäki, Kantosalo ve Lakkala (2011), dijital okuryazarlığı, teknoloji aracılığıyla bilgiye erişim, transfer ve iletişim kurma yeteneği olarak tanımlarken, aynı zamanda teknolojiyi günlük hayatta aktif olarak kullanmayı da içermektedir. Eshet-Alkalai (2004) ise dijital okuryazarlığın, bilgiyi öğrenme, anlama, değerlendirme ve kullanma yeteneğini içerdiğini, görsel okuryazarlığın ise görsel düşünme yeteneğini; yeniden üretim okuryazarlığının yaratıcı yeniden üretim becerilerini; sosyal-duygusal okuryazarlığın dijital ortamlarda sosyalleşmeyi ve hiper metin kullanmayı içerdiğini belirtmiştir. Dijital yetkinlik, bireylerin dijital dünyada eleştirel ve sorumlu bir şekilde gezinmelerini sağlayan bir dizi beceri, tutum ve bilgiyi kapsamaktadır. Bilgi, iletişim, medya, bilişim güvenliği gibi farklı okuryazarlıkları içeren dijital yeterlilik, öğretmenlerin yeni teknolojiler ile sürekli kendilerini yenilemeleri gerekliliği üzerinde duran çok sayıda bilimsel çalışma tarafından ele alınmıştır. Cattaneo ve diğerleri (2022), öğretmenlerin dijital yeterliliğinin

son yıllarda uluslararası eğitim politikalarında önemsenen bir faktör olduğunu belirtmektedir. Horzum ve Demircioğlu Diren (2022), dijitalleşmenin nitelikli ve verimli öğrenme süreçleri gerçekleştirebileceğini ifade ederken, Kocaman Karoğlu ve diğerleri (2020), eğitimde dijitalleşmenin ulaşılabilir bir öğrenme deneyimi sunacağını bildirmektedir. Öğretmen adaylarının dijital okuryazarlık düzeyleri ile ilgili çalışmalar da giderek literatürde daha fazla yer almaktadır (Yontar, 2019; Sarıkaya, 2024; Kaman & Bulut 2024).

Yöntem: Araştırmanın bu basamağında nicel araştırma deseni kullanılmıştır. Nicel araştırma deseninde, veriler sayısal olarak toplanır ve analiz edilerek kalıplar, ilişkiler ve trendler belirlenir. Öğretmen adaylarının dijital okuryazarlık seviyelerini belirlemek için Bayrakcı ve Narmanlıoğlu (2021) tarafından geliştirilen "Dijital Okuryazarlık Ölçeği" kullanılmıştır. Bu ölçek, 29 maddeden oluşmakta olup, Etik ve Sorumluluk, Genel Bilgi ve Fonksiyonel Beceriler, Günlük Kullanım, İleri Düzey Üretim, Gizlilik ve Güvenlik, Sosyal Boyut olmak üzere altı boyutta yapılandırılmıştır. Beşli Likert tipi derecelendirme kullanılmış olup, 1 (Kesinlikle Katılmıyorum) ile 5 (Kesinlikle Katılıyorum) arasında değişmektedir. Ankete üç ek madde eklenmiştir. Ölçekte tersine çevrilmiş madde bulunmamaktadır. Ölçekte alınabilecek en yüksek puan 145, en düşük puan ise 29'dur. Ölçeğin kullanımı için izin Ek 1'de verilmiş olup, ölçeğin tam metni Ek 2'de yer almaktadır. Bu çalışmada kullanılan Dijital Okuryazarlık Ölçeği'nin (DOYÖ) güvenirliğini sağlamak amacıyla güvenirlik analizi yapılmıştır. Ölçeğin güvenirliği, iç tutarlılık ölçüsü olan Cronbach Alfa kullanılarak ölçülmüş ve 0.898 Cronbach Alfa katsayısı elde edilmiştir. Çalışma grubu, 2023-2024 akademik yılında Türkiye'deki bir üniversitede İngilizceyi yabancı dil olarak öğretme programında öğrenim gören 255 öğretmen adayından oluşmaktadır. Bu çalışmada, her bireyin seçilme şansının eşit olduğu olasılıklı örnekleme yöntemi kullanılmıştır. Özellikle, olasılıklı örnekleme türlerinden biri olan basit rastgele örnekleme yöntemi kullanılmıştır. Bu yöntemde, araştırmacı popülasyondan rastgele bir alt grup seçer ve her bireye eşit seçilme şansı verir. Bu yaklaşım, nicel araştırmalar için özellikle uygundur. Bu çalışmada toplanan veriler SPSS yazılımının 25.0 sürümü kullanılarak analiz edilmiştir. Veri toplama süreci, öğrencilere dijital okuryazarlık testlerinin uygulanmasını içermektedir. Dijital okuryazarlık testlerinin sonuçları hem betimsel hem de istatistiksel olarak analiz edilmiştir. Betimsel analiz, verileri özetlemek için gerçekleştirilirken, bağımsız örneklem t-testleri ve tek yönlü ANOVA kullanılarak çıkarımsal istatistiksel analiz yapılmıştır. Bağımsız örneklem t-testi, cinsiyete dayalı olarak dijital okuryazarlık seviyelerindeki anlamlı farklılıkları belirlemek için kullanılmıştır. Ayrıca, farklı sınıf düzeylerindeki dijital okuryazarlık puanlarını incelemek için tek yönlü ANOVA kullanılmıştır. Bu kapsamlı yaklaşım, öğretmen adaylarının dijital okuryazarlık seviyelerinin detaylı bir şekilde anlaşılmasını sağlamıştır.

Sonuç ve Değerlendirme: Betimsel istatistiklere dayanarak, öğretmen adaylarının Etik ve Sorumluluk, Günlük Kullanım ve Gizlilik ve Güvenlik konularında yüksek yetkinlik gösterdiği ortaya çıkmıştır. Genel Bilgi ve Fonksiyonel Beceriler ve Sosyal Boyut konularında orta düzeyde yetkinlik göstermişlerdir. İleri Düzey Üretim konusunda düşük yetkinlik gösterdikleri tespit edilmiştir. Bu analiz, hem erkek hem de kadın öğretmen adayları için güçlü ve geliştirilmesi gereken alanları ortaya koymaktadır. Veri analizi cinsiyetler arasında bazı dijital okuryazarlık becerilerinde farklılıklar olduğunu, ancak bu farklılıkların çoğunun istatistiksel olarak anlamlı olmadığını göstermektedir. Genel bilgi ve bilgi becerileri konusunda erkekler anlamlı derecede daha yüksek puan almışlardır. ANOVA sonuçları ise, günlük kullanım ve sosyal becerilerin sınıflar arasında anlamlı farklılıklar gösterdiğini, ancak etik sorumluluk, genel bilgi, profesyonel beceriler ve gizlilik konularında anlamlı farklılıklar göstermediğini ortaya koymaktadır.