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Original Article

Turkish Adaptation of the Digital Literacy Scale: A Validity and Reliability Study

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ABSTRACT

Objective: This study sets out to examine the reliability and validity of the Digital Literacy Scale's Turkish version.

Methods: The study employed a methodological, cross-sectional, and descriptive design. The study sample consisted of students and academic and administrative staff at a state university, and 302 people participated. Personal information form, the Digital Literacy Scale by Reddy et al (2023), and the Digital Literacy Scale by Bayrakcı and Narmanlıoğlu (2021) were employed to gather data. Language validity, content validity, construct validity, and reliability analyses were carried out to assess the validity and reliability of the scale.

Results: The Digital Literacy Scale's Cronbach's alpha was 0.978. For test–retest reliability, the intraclass correlation coefficient varied between 0.879 and 0.918, which was significant for the scale. Factor analysis revealed a 6-factor structure. A strong and significant correlation between the scales was found using the parallel form reliability method ($r = 0.734$, $P < .001$).

Conclusion: It was found that the Digital Literacy Scale's Turkish version is a valid and reliable tool for determining digital literacy.

Keywords: Digital literacy, reliability, validity

Introduction

As technology advances, digital content usage becomes more common, leading to significant changes that impact people's lives. People require complex skills and literacy to use novel technologies and tools as the internet grows and digitalization affects our lives.[1] Having the skills and knowledge required to use technology safely and effectively is essential.[2] Digital literacy has been characterized by several authors as "the ability to understand and use information in multiple formats from a wide variety of sources available through computers,"[3] "the ability to find, organize, understand, evaluate and create information using digital technologies and the internet."[2] As technological advances are used more often, the meaning of digital literacy has changed as well. Digital literacy, according to Covello (2010), "is the combination of computer, media, information, visual, communication, and technology."[4] The present definition revises the concepts of digital literacy and the 6 literacies to align with the 21st-century demands for digital proficiency. This is because user-generated material is becoming more prevalent, privacy and security concerns are growing, and data is becoming more accessible and available.[1] Individuals use technology for many purposes, such as communicating, reading news, watching movies, etc. Digital literacy skills have an essential place in solving the problems encountered, as well as increasing the safe use of the internet during the use of different technologies and enabling individuals to have the ability to make decisions about the accuracy/inaccuracy of the information obtained.[5,6]

Recently, there has been significant attention on digital literacy due to the surge in internet usage and advancements in technology. This literacy encompasses multiple competencies, including accessing, producing, and sharing accurate information, as well as effectively utilizing various technologies in learning and teaching processes.[7] The first step to developing these skills is assessing an individual's digital literacy levels.

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A literature review reveals various scales to evaluate digital literacy in Türkiye.[8,9] Hamutoğlu et al (2017) adapted the "Digital Literacy Scale" into Turkish resulting in that it had 4 sub-dimensions: technical, social, attitude, and cognitive.[9] The Digital Literacy Scale, created by Bayrakcı and Narmanlıoğlu (2021), comprises 6 dimensions: General knowledge and functional skills, privacy and security, professional production, daily use, ethics and responsibility, and social dimension. The primary objective of the scale is to assess digital competencies.[8] The prerequisites for employing digital technology are evolving together with the technology itself. Therefore, the measurement tools need to be updated in parallel with the change in the scope of digital competence.

The existing scales used in Türkiye have skills gaps; for example, the Turkish adaptation of the Digital Literacy Scale by Hamutoğlu et al (2017)[9] focuses on knowledge, attitude, and social aspects of digital literacy. Conversely, the technical, ethical, and security aspects of digital literacy are the main focus of the Digital Literacy Scale created by Bayrakcı and Narmanlıoğlu (2021)[8]. The Digital Literacy Scale (DLS), created in 2023 by Reddy et al (2023), is considered the most recent and valid measurement tool for determining the level of digital literacy in the worldwide literature.[10]

Reddy et al's (2023)[10] scale was designed with the demands of the 21st century in mind. It encompasses a variety of digital abilities related to computers, media, information, visual, communication, and technology that are necessary in the 21st century. This tool addresses every facet of digital literacy in the 21st century, according to a review of the literature. To measure 21st-century digital skills and make appropriate interventions for improvements, there is a need to use a scale compatible with 21st-century skills.

It is believed that assessing people's digital literacy using a scale that satisfies 21st-century requirements for digital competency will have numerous advantages, including identifying strengths and weaknesses tracking development, encouraging digital inclusion, benchmarking, and comparison. These benefits can contribute to advancing digital literacy education and skills development, ultimately contributing to individuals' success in the digital age. This study aimed to assess the validity and reliability of the Reddy et al (2023)[10] DLS in Turkish.

Methods

Study Design

The design of this study is methodological, cross-sectional, and descriptive.

Setting and Participants

In 2024, the study was conducted in January and February, involving students and academic and administrative staff in a Turkish public university. 302 participants took part in the study. The most widely used method for figuring out the sample size in research on the reliability and validity of scales is the number of scale items. The sample size was determined by counting the items on the scale. This means that the sample size needs to be no fewer than 5 times larger than the total number of items on the scale.[11] The DLS we want to adapt consists of 60 items.[10] For this investigation, a minimum sample size of 300 was established since it was intended to include at least 5 times as many scale items (60 × 5). The power of the study was calculated on the "G-Power-3.1.9.4" software. According to the power analysis conducted at the end of the study, the power of the study was determined as 0.99. The inclusion criteria are as follows: participants aged 18 years of age and older and native speakers of Turkish.

Measure

The DLS created by Reddy et al (2023)[10], whose validity and reliability study will be carried out, the personal information form, and the DLS created by Bayrakcı and Narmanlıoğlu (2021)[8] as a criterion scale were used to gather the data.

Personal Information Form

The researchers developed this form in compliance with the literature.[1,8-10] The form has 7 questions concerning the participants' sociodemographic characteristics, in addition to their utilization of the internet, technological devices, and technology.

Digital Literacy Scale by Reddy et al

Reddy et al (2023) created this scale to assess digital literacy. The 60 items on the scale are divided into 6 sub-dimensions: media literacy, computer literacy, information literacy, visual literacy, and communication literacy. The scale has 5 points, ranging from 1 (no understanding) to 5 (very high, expert). The scale does not contain any reversal items. The digital literacy scale has total scores that vary between 0 and 60. The weighted total-maximum score derived from each subdimension of the scale is 10. The scale's scores are evaluated into 6 levels: L1 (0-10 points-no understanding), L2 (11-20 points-very low), L3 (21-30 points-low), L4 (31-40 points-average), L5 (41-50 points-high), and L6 (51-60 points-very high-expert). The scale's Cronbach's alpha coefficient is 0.90, while the sub-dimension coefficients range from 0.85 to 0.96.[10]

Digital Literacy Scale by Bayrakcı and Narmanlıoğlu

To assess digital literacy, Bayrakcı and Narmanlıoğlu (2021) created this scale. There are 6 sub-dimensions within the 29 items: privacy and security, advanced production, daily use, general information and functional skills, ethics and responsibility, and social dimension. A 5-point Likert-type scale is used to score each item on the scale (1 being strongly disagree and 5 being strongly agree). The scale does not contain any reversal items. Scores on the digital literacy scale range from 29 to 145. The scale has no cut-off point, and high digital literacy is indicated by high scores on either the overall scale or any of its sub-dimensions. The scale has a Cronbach's alpha coefficient of 0.91, whereas the sub-dimensions have coefficients ranging from 0.72 to 0.86.

Data Collection

The research data was collected using the procedures listed below.

Language Validity

Written consent was emailed to the original scale's author to adapt the digital literacy scale into Turkish. Using the "translation-back translation method," the scale's language validity was assessed.[12] Two translators, both native Turkish speakers with strong English proficiency and familiarity with the scale's terminology, translated the original scale from English into Turkish. Two faculty members with advanced English competence then back-translated the translated version into English. A check was conducted on the back-translated version to verify that the meaning and language aligned with the original scale.

Content Validity

Content validity was assessed through expert review. The translated and original scales were evaluated using the Lawshe technique. Therefore, to ascertain if the items were equal, professional views from 7 faculty members employed by various academic units were acquired. The scale was completed after the items had been revised while considering the expert opinions.

Following content validity, the draft Turkish scale underwent an intelligibility pilot test with 15 participants. If any of these expressions were

unclear, the participants were asked to offer their opinions and recommendations. Respondents are given a space in the questionnaire to provide feedback on unintelligible parts. After the pilot test, no issues were found in the items and therefore no changes were made. The study sample did not include those who took part in the pilot study.

Construct Validity

Confirmatory factor analysis (CFA) was utilized to investigate the construct validity of the scale. Confirmatory factor analysis investigates the fit of a previously proven structure in a new data set. In CFA, factor loadings and fit index scores were evaluated. The trucker Lewis index (TLI), goodness-of-fit index (GFI), incremental fit index (IFI), comparative fit index (CFI), Satorra-Bentler scaled chi-square (S-Bχ2)/degrees of freedom ratio (CMIN/DF), and root mean square error of approximation (RMSEA) were among the fit indices utilized.

Reliability

The digital literacy scale's reliability was evaluated using internal consistency, split-half, time-dependent invariance, and parallel form methods. Item—total score reliability and Cronbach's alpha reliability coefficient are 2 often used methods to evaluate a measurement tool's internal consistency.[13] The reliability of the item—total score and Cronbach's alpha reliability coefficient were computed to assess the internal consistency of the scale. Invariance refers to the consistent and reliable results from a measuring tool across different periods.[14] In this study, parallel form reliability and the test–retest method were used to evaluate invariance. Two weeks later, the scale was returned to the participants (n = 151) for an evaluation of the scale's time-dependent invariance. Digital literacy levels of the participants were increased, according to test–retest findings, and reliability was also assessed using the split-half method.

To assess parallel form reliability, the DLS developed by Reddy et al (2023) and the DLS created by Bayrakcı and Narmanlıoğlu (2021) were administered to the participants at the same time, and the correlation between the test scores was examined.

Implementation of the Study

Google Forms was used to administer an online survey that gathered data from January 2024 to February 2024 through the institutional e-mails and WhatsApp applications of the selected university. Participants were asked to provide their email addresses on the questionnaire to match their initial responses with the retest responses anonymously. It took each participant 15-20 minutes to finish the survey.

Ethical Consideration

The Hacettepe University's Ethics Board for Social Sciences and Humanities Research approved this study (Approval no: E-66777842-300-00003204798, Date: November 14, 2023). Upon obtaining written permission from the original scale's author via email, institutional permission was obtained to conduct the study with participants following the ethics committee's approval. In addition, the participants were informed of the study's purpose, and a voluntary consent form was used to get their consent.

Statistical Analysis

Data analysis was conducted using the Statistical Package for Social Sciences version 23.0 software (IBM Corp.; Armonk, NY, USA) and AMOS (Analysis of Moment Structures) version 23.0 software. The normality of the data distribution was assessed using the Shapiro-Wilk test. Descriptive statistics, including frequency, percentage, mean, and SD, were calculated for participant demographics. The content validity index (CVI) was used to assess the language and content validity of the scale. The sample size adequacy for factor analysis was evaluated through the Keiser–Mayer–Olkin (KMO) test and Bartlett's test of sphericity. Confirmatory factor analysis was used to test the extent to which the items in the scale explain the structure of the original scale. To assess the goodness-of-fit, the following indices were expected: Trucker Lewis index (TLI) ≥ 0.90, goodness-of-fit index (GFI) ≥ 0.90, incremental fit index (IFI) ≥ 0.90, comparative fit index (CFI) ≥ 90, a Satorra–Bentler scaled chi-square (S-Bχ2)/degrees of freedom ratio (CMIN/DF) ≤ 5.0, and a root mean square error of approximation (RMSEA) ≤ 0.08.[15] The reliability of the scale was estimated using Cronbach's alpha coefficient. The relationship between the scale and its subscales, test–retest reliability, and parallel form reliability was tested using Pearson correlation analysis. Furthermore, values for average variance extracted (AVE) and composite reliability (CR) were computed. Statistical significance was determined as $P < .05$.[16]

Results

Participants' Characteristics

Participants' mean age was 26.77 ± 9.56, 82.5% of them were female, 76.2% were married, 71.2% of the participants were bachelor's degree graduates, and the average daily internet usage time was 5.36 hours (Table 1). Smartphones and laptops were the devices that participants used the most, respectively. According to the intended use of the devices, it was found that smartphones and laptops were used most frequently for work, research, communication, education, and personal purposes (Table 2). WhatsApp (100%), E-mail (96%), and YouTube (92.1%) are the technologies that participants use the most. The least used technologies were Blog (1%), Slide share (2.3%), Dropbox (4.6%), and Skype (4.6%) (Table 3).

Content Validity

The CVI assessed by 7 experts using The Davis technique was uniformly high at 1.0. Since every item—total correlation was higher than 0.3, the content validity was deemed sufficient (Table 4).

Construct Validity

The results showed that Bartlett's test of sphericity was 14717.43 ($P < .001$), and the Keiser–Mayer–Olkin (KMO) value was 0.960. Confirmatory factor analysis showed the following fit indices: TLI = 0.910, GFI = 0.915, IFI = 0.914, CFI = 0.914, CMIN/DF = 2.686, and RMSEA = 0.076. These results support a satisfactory model fit, with the scale comprising 6 factors: Media Literacy (items 1-13), Communication Literacy (items 14-18), Information Literacy (items 19-29), Visual Literacy (items 30-42), Technology Literacy (items 43-54), and Computer Literacy (items 55-60) (Figure 1). Higher scores on the scale, ranging from 0 to 60, indicate higher levels of digital literacy.

Table 1. Characteristic of Participants

Variable	n (%)	Mean ± SD (minimum–maximum)
Age (years)		26.77 ± 9.56 (18-60)
Gender		
Female	249 (82.5)	
Male	53 (17.5)	
Marital status		
Single	72 (23.8)	
Married	230 (76.2)	
Education level		
Associate degree	12 (4.0)	
Bachelor's degree	215 (71.2)	
Master's degree	34 (11.2)	
PhD	41 (13.6)	
Daily internet usage (hours)		5.36 ± 2.82 (1-20)

Table 2. Devices and Intended Uses (%)

	Work	Research	Communication	Education	Personal
Smartphone	132 (43.7)	199 (65.9)	251 (83.1)	198 (65.6)	194 (64.2)
Desktop PC	57 (18.9)	59 (19.5)	23 (7.6)	56 (18.5)	26 (8.6)
Laptop	90 (29.8)	175 (57.9)	84 (27.8)	198 (65.6)	131 (43.4)
Tablet	28 (9.3)	63 (20.9)	32 (10.6)	58 (19.2)	68 (22.5)

Table 3. Technology Usage

	n (%)		n (%)		n (%)
E-mail	290 (96.0)	Google+	182 (60.3)	Podcast	47 (15.6)
Facebook	74 (24.5)	Moodle	30 (9.9)	TikTok	25 (8.3)
WhatsApp	302 (100.0)	YouTube	278 (92.1)	Blog	3 (1.0)
Skype	14 (4.6)	Slide share	7 (2.3)	Dropbox	14 (4.6)
Twitter	149 (49.3)	LinkedIn	64 (21.2)		

Cultural Adaptation

No significant issues were encountered during the cultural adaptation of the DLS to Turkish. Feedback from a pilot study with 15 participants showed that all items were straightforward and comprehensible, with no negative feedback reported.

Test–Retest Reliability and Internal Consistency

The scale's internal consistency was quite good, with a Cronbach's alpha of 0.978. The range of item—total score correlations was 0.799 to 0.914. Analysis indicated that removing any item would not increase the overall Cronbach's alpha, leading to the decision not to omit any items. High reliability was shown by the Intraclass Correlation Coefficient (ICC) for test–retest reliability, which ranged from 0.879 to 0.918 (Table 5). The split-half method's Spearman-Brown coefficient was 0.985, which added to the scale's reliability.[16]

Composite Reliability (CR) and Average Variance Extracted (AVE): Supplementary Table 1 displays the values of the Digital Literacy Scale's composite reliability (CR) and average variance extracted (AVE) for each factor. Every factor has an AVE value greater than 0.50 and a CR value greater than 0.70.[17]

Convergent Validity

There was a good and strong correlation between the total score of the adapted DLS and DLS by Bayrakcı & Narmanlıoğlu (2021) ($r = 0.734$, $P < .001$), indicating sufficient convergent validity (Table 6).

Floor and Ceiling Effect

The analysis revealed no significant floor or ceiling effects, with 0.3% at the floor and 1.7% at the ceiling, suggesting that the scale adequately captures the full range of digital literacy levels among participants.

Table 4. Item Analysis of the DLS

Items	Mean ± SD	Item—Total Correlation	Cronbach's Alpha When the Item is Deleted	Items	Mean ± SD	Item—Total Correlation	Cronbach's Alpha When the Item is Deleted
1	3.23 ± 1.073	0.475	0.978	31	3.52 ± 0.896	0.761	0.977
2	3.56 ± 0.844	0.548	0.978	32	3.62 ± 0.817	0.754	0.977
3	3.31 ± 0.924	0.684	0.977	33	3.45 ± 0.905	0.778	0.977
4	2.41 ± 1.061	0.541	0.978	34	3.08 ± 0.966	0.721	0.977
5	3.46 ± 0.884	0.598	0.978	35	3.39 ± 0.859	0.732	0.977
6	2.53 ± 1.122	0.480	0.978	36	3.32 ± 0.903	0.725	0.977
7	3.70 ± 0.853	0.558	0.978	37	3.44 ± 0.879	0.762	0.977
8	3.78 ± 0.817	0.547	0.978	38	3.41 ± 0.917	0.681	0.977
9	3.42 ± 0.911	0.548	0.978	39	3.27 ± 0.929	0.707	0.977
10	3.25 ± 0.952	0.643	0.977	40	3.25 ± 0.962	0.700	0.977
11	3.63 ± 0.938	0.636	0.977	41	3.21 ± 0.910	0.733	0.977
12	3.30 ± 0.956	0.641	0.977	42	3.28 ± 0.966	0.630	0.977
13	3.83 ± 0.731	0.634	0.977	43	3.33 ± 0.921	0.722	0.977
14	3.33 ± 1.077	0.630	0.977	44	3.12 ± 1.016	0.710	0.977
15	3.09 ± 1.014	0.539	0.978	45	3.12 ± 0.995	0.703	0.977
16	2.97 ± 1.028	0.718	0.977	46	3.51 ± 0.884	0.737	0.977
17	4.12 ± 0.728	0.419	0.978	47	2.80 ± 1.076	0.705	0.977
18	3.21 ± 1.055	0.664	0.977	48	3.00 ± 1.205	0.667	0.977
19	2.87 ± 1.086	0.572	0.978	49	3.44 ± 0.930	0.673	0.977
20	3.01 ± 1.060	0.611	0.978	50	3.14 ± 1.150	0.756	0.977
21	2.63 ± 1.128	0.642	0.977	51	3.12 ± 0.983	0.785	0.977
22	3.72 ± 0.814	0.718	0.977	52	2.67 ± 1.139	0.681	0.977
23	3.02 ± 1.064	0.682	0.977	53	2.38 ± 1.262	0.628	0.978
24	3.20 ± 1.112	0.628	0.977	54	2.49 ± 1.132	0.643	0.977
25	3.20 ± 1.016	0.643	0.977	55	4.15 ± 0.833	0.475	0.978
26	2.60 ± 1.145	0.552	0.978	56	3.03 ± 1.286	0.547	0.978
27	3.39 ± 0.907	0.727	0.977	57	2.78 ± 1.098	0.689	0.977
28	3.48 ± 0.917	0.776	0.977	58	3.94 ± 0.867	0.561	0.978
29	3.89 ± 0.910	0.664	0.977	59	3.54 ± 1.071	0.685	0.977
30	3.63 ± 0.876	0.737	0.977	60	3.78 ± 0.959	0.450	0.978

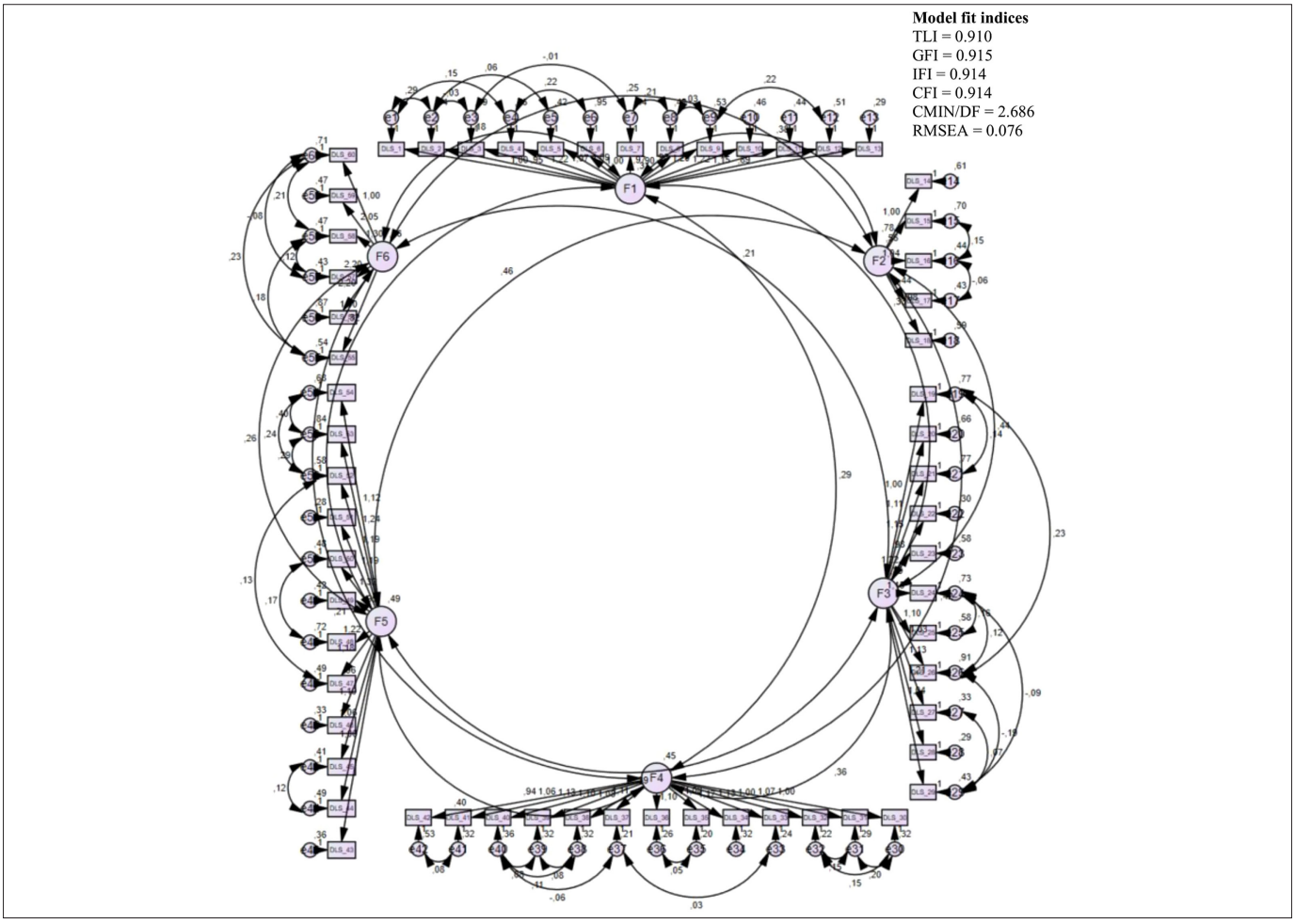

Figure 1. Path diagram of the DLS.

Discussion

The current study's findings showed that the DLS is a reliable and valid scale for determining how digitally literate Turkish people are. Analyses of the scale's reliability, construct validity, language validity, and content validity were carried out as part of the study. The scale was kept in its original format and the scale items were left unchanged as a result of the analysis.

Validity of DLS

In scale adaptation studies, one of the critical parameters is that the adapted scale is appropriate to the culture of the society. As a result, the "translation-back translation method" was employed in this study to verify the scale's language validity.[12] Experts in the field with a solid understanding of Turkish society's cultural structure translated the scale. In scale adaptation studies, in addition to language validity, it is recommended to evaluate whether the measurement tool accurately reflects the variable to be measured. Within the scope of the content validity assessment, 7 experts were consulted, and the CVI value was determined to be 1.00. It states that items with a content validity score lower than 0.80 should be modified or eliminated from the scale.

After performing Bartlett's sphericity and Keiser–Mayer–Olkin (KMO) tests, it was concluded that the sample size was adequate for factor analysis.[18] According to the results of the CFA, RMSEA values between 0.05 and 0.08 have been proposed as acceptable.[15] Consequently, the RMSEA value of 0.076 for this sample indicates a good fit. Furthermore, the values of TLI, GFI, IFI, and CFI exceeded 0.90.[15] The CMIN/DF ratio

Table 5. Internal Consistency and Test–Retest Reliability of the DLS

Items	Correlated Item—Total Correlation	Cronbach's Alpha if the Item is Deleted	ICC (95% CI)	*P*
Media Literacy	0.855	0.768	0.904 (0.868-0.930)	<.001
Communication Literacy	0.832	0.802	0.885 (0.842-0.916)	<.001
Information Literacy	0.914	0.764	0.895 (0.856-0.923)	<.001
Visual Literacy	0.868	0.757	0.891 (0.850-0.920)	<.001
Technology Literacy	0.882	0.753	0.891 (0.850-0.920)	<.001
Computer Literacy	0.799	0.798	0.879 (0.834-0.912)	<.001
Sum score			0.918 (0.887-0.940)	<.001

CI: Confidence Interval; ICC: Intraclass Correlation Coefficient.

Table 6. Correlation of Reddy et al (2023)'s DLS with Bayrakcı & Narmanlıoğlu (2021)'s DLS

		Digital Literacy Scale (Bayrakcı & Narmanlıoğlu. 2021)						
		Ethics and Responsibility	General Knowledge and Functional Skills	Daily Usage	Advanced Production	Privacy and Security	Social Dimension	Sum score
		r *P*	*r* *P*	*r* *P*	*r* *P*	*r* *P*	*r* *P*	*r* *P*
Digital Literacy Scale (Reddy et al 2023)	Media Literacy	.524**	.451**	.567**	.135*	.460**	.412**	.586**
		<.001	<.001	<.001	0.019	<.001	<.001	<.001
	Communication Literacy	.401**	.468**	.543**	.284**	.377**	.425**	.567**
		<.001	<.001	<.001	<.001	<.001	<.001	<.001
	Information Literacy	.465**	.551**	.597**	.312**	.447**	.530**	.659**
		<.001	<.001	<.001	<.001	<.001	<.001	<.001
	Visual Literacy	.513**	.482**	.523**	.290**	.429**	.478**	.609**
		<.001	<.001	<.001	<.001	<.001	<.001	<.001
	Technology Literacy	.416**	.722**	.559**	.506**	.435**	.609**	.737**
		<.001	<.001	<.001	<.001	<.001	<.001	<.001
	Computer Literacy	.523**	.521**	.643**	.235**	.578**	.405**	.651**
		<.001	<.001	<.001	<.001	<.001	<.001	<.001
	Sum score	.545**	.615**	.649**	.351**	.512**	.558**	.734**
		<.001	<.001	<.001	<.001	<.001	<.001	<.001

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

indicated an excellent fit for the indices, falling between 2.0 and 5.0. The items gathered under 6 factors following factor analysis were media literacy, computer literacy, information literacy, visual literacy, and communication literacy.

Convergent validity was demonstrated using the DLS created by Bayrakcı and Narmanlıoğlu (2021), providing an additional way to present structural validity. In the parallel form reliability method, it is expected that the measurement tools assessing similar features are related to each other.[14] It was found that there was a relationship between all the subscales of the DLS[8] and the DLS.[10] Strong correlations were found between the overall scores ($r = 0.734$, $P < .001$). The study's findings are in line with the original scale's findings on validity and reliability. Additionally, the reliability of the scale was evaluated by examining CR and AVE values. For convergent validity, the AVE value should be above 0.50. The threshold value for CR is 0.70, and it should exceed this value.[17] In our study, the AVE and CR values were found to exceed these thresholds, indicating the establishment of convergent validity and reliability.

Reliability of DLS

Any measurement equipment needs to be able to measure mistakes independently and consistently, which is a critical component of reliability. Some calculations were made to assess the reliability of the DLS, including Cronbach's alpha if the item was deleted, ICC, confidence intervals, item—total correlation, and the Spearman-Brown coefficient for the split-half approach.

We considered a value greater than 0.3 in item—total correlation as indicative that an item was associated with the overall scale.[19] In the DLS, item—total correlations ranged from 0.799 to 0.914. Item—total correlation analysis was used in this study to establish that all DLS items showed reliability.

The reliability coefficient of Cronbach's alpha was used to assess the internal consistency of the scale items. The DLS's Cronbach's alpha coefficient was found to be 0.978. Strong reliability is indicated by a Cronbach's alpha score greater than 0.80.[20] High reliability is indicated by the study's Cronbach's alpha value. Furthermore, the split-half approach was used to evaluate the reliability of the scale. Studies indicate that the Spearman-Brown coefficient should equal or exceed the Cronbach's alpha value.[18] The Spearman-Brown coefficient in Split-half reliability analysis was greater than Cronbach's alpha value.

To assess intratester reliability using intraclass correlation, test–retest reliability was examined. According to the literature, it is recommended that this value should be 0.70 or higher.[21] Test–retest reliability in this study was found to be high, ranging from 0.879 to 0.918. As a result, the research indicates that the Turkish DLS version's internal consistency is sufficient. It is possible to view the DLS as a trustworthy scale that may be used on a Turkish population at different times.

Conclusion

The DLS is a valid and reliable tool for determining an individual's level of digital literacy, according to the findings of the validity and reliability analyses. Validity and reliability analysis, confirmatory factor analysis, and content validity were all carried out for the scale within the scope of the study. The structure of the scale was found to be composed of 6 factors. Although there are tools to measure digital literacy in the literature, changes in digital technologies have also occurred in the competencies within the scope of digital literacy. Therefore, this situation has brought about a change in the tools for measuring digital literacy. The DLS is a comprehensive and up-to-date measurement tool that measures digital literacy levels over 6 factors. It is thought that evaluating the digital literacy levels of individuals with a measurement tool that covers the digital competencies of the 21st century will contribute to the development of digital literacy skills.

Ethics Committee Approval: Ethics committee approval was received for this study from the Social Sciences and Humanities Researches Ethics Board of Hacettepe University (Approval no: E-66777842-300-00003204798, Date: November 14, 2023).

Informed Consent: Written informed consent was obtained from participants who participated in this study.

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Supplementary Table 1. Average Variance Extracted (AVE) and Composite Reliability (CR)

Factor	AVE	CR
Factor 1	0.501	0,896
Factor 2	0.506	0,774
Factor 3	0.547	0,905
Factor 4	0.748	0,958
Factor 5	0.657	0,939
Factor 6	0.535	0,805