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Adaptation of the Digital Maturity Inventory into Turkish: A Study of Validity and Reliability

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Abstract
The aim of this study is to adapt the Digital Maturity Inventory, originally developed by Laaber et al. (2023), into Turkish and to examine its psychometric properties. As part of the adaptation process, the original English version was translated into Turkish using the back-translation method. The Turkish version of the inventory was administered to 879 undergraduate students from two universities located in the eastern and southern regions of Türkiye across three different time points. Confirmatory Factor Analysis (CFA) was conducted on data collected from 348 students, and the results confirmed the original ten-dimensional structure of the inventory. For criterion-related validity, the Digital Literacy Scale and the Mobile Information Security Awareness Scale were administered to 281 students, and correlation coefficients were calculated. Reliability evidence was evaluated through internal consistency coefficients and composite reliability values. Additionally, to assess the temporal stability of the inventory, it was re-administered to a subsample of 228 students from the CFA group, and test-retest reliability was calculated. The findings indicate that the Turkish version of the Digital Maturity Inventory is a valid and reliable measurement tool.

Keywords: Digital maturity, Scale adaptation, University students

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Introduction

The role of digital technologies in everyday life is steadily increasing. This trend has led to a marked rise both in individuals' use of mobile technologies and in the amount of time they spend online (Kolhar et al., 2021). This increase offers individuals numerous opportunities and conveniences. Digital technologies enhance capabilities such as ease of communication, access to information, problem-solving, attention management, innovativeness, critical thinking, adaptation, participation, and collaboration (Cheng & Siow, 2018; Dekhane et al., 2013). These skills not only facilitate individuals' daily lives but also contribute directly to their educational experiences and professional careers. For today's university students, such competencies are crucial for successfully completing their education and remaining competitive in their future careers (Avdiu et al., 2025; Criollo-C et al., 2021; Purwanto et al., 2023; González-Pérez & Ramírez-Montoya, 2022; Van Laar et al., 2020).

However, alongside the positive effects of digital technologies, there are also several negative consequences. A range of adverse outcomes—such as declines in academic achievement, disruptions in sleep patterns, weakened social relationships, increased procrastination behaviors, and emerging security risks—have been observed as a result of excessive or unmindful use of digital technologies (Criollo-C et al., 2021; Kolhar et al., 2021; Meier, 2022). Therefore, it is essential to evaluate individuals' relationship with digital technologies in terms of both benefits and risks. Today, achieving a balance between maximizing the opportunities offered by digital technologies and avoiding their negative effects is considered a significant concern for researchers. Studies in this area have largely focused on issues such as technology addiction and screen time (Agarwal & Kar, 2015; Brauchli et al., 2024; Kwon et al., 2024; Ning et al., 2025; Park & Chang, 2025; Yufan, 2024). However, approaches that examine individuals' mobile technology habits allow for a more holistic and in-depth understanding of the effects of digital engagement (Meier, 2022; Roffarello & De Russis, 2021).

Because research indicates that both low and excessive use of digital technologies is associated with decreased well-being, whereas moderate use may be linked to higher life satisfaction. In addition, procrastination and passive patterns of use tend to lead to negative outcomes; by contrast, active forms of use that involve social interaction are associated with more positive effects (Dienlin & Johannes, 2020; Meier, 2022; Taylor & Bazarova, 2021). In this context, individuals need to develop a conscious, balanced, and responsible approach to using digital technologies—one that maximizes their benefits while minimizing potential harms.
The concept of digital maturity has emerged as an approach that directly addresses this need. Digital maturity refers to a set of abilities and attitudes that enable individuals to use digital technologies effectively, consciously, and in a balanced manner in ways that support both personal development (growth) and integration into society (adaptation) (Laaber et al., 2023). A review of the literature shows that digital maturity has largely been associated with organizations' readiness and capabilities to use digital technologies effectively (Haryanti et al., 2023; Kane et al., 2017; Rader, 2019). However, in recent years, as attention has increasingly shifted to the individual-level effects of digital technologies and their responsible use, digital maturity has begun to be considered an important concept for individuals as well (Hofmans et al., 2024).

In particular, as digitalization has begun to play a decisive role across all spheres of social life, individuals' ability to work with these technologies effectively and adaptively has become increasingly dependent on their digital competencies. In Türkiye, the limited number of studies that aim to measure levels of digital maturity indicates a need for further research on this concept at the individual level. By adapting an internationally validated scale into Turkish, the present study aims to make a significant contribution to the measurement of individual digital maturity. It also seeks to propose actionable strategies for improving individuals' digital skills. Moreover, assessing levels of digital maturity has the potential to inform strategic decision-making across a wide range of domains—from education policies to organizations' human resources practices. Therefore, this study has the potential to offer practical and tangible contributions not only to the academic community but also to practitioners.

Related Literature

Maturity is a multidimensional construct encompassing technology, personal development, and physical growth (Rodríguez Salvado et al., 2019). Within this multifaceted structure, digital maturity is regarded as a critical concept for understanding individuals' interactions with digital technologies and for identifying the societal, economic, and cultural effects of these interactions (van Laar et al., 2020). Digital maturity is defined as a set of competencies, values, and attitudes that enable individuals to use digital technologies effectively and responsibly in both personal development and social adaptation processes (Laaber et al., 2023). In addition, digital maturity is closely related to individuals' digital skills, levels of digital awareness, and their overall attitudes toward the digital

world (van Laar et al., 2020). Importantly, this concept extends beyond technical skills to include cognitive and behavioral components such as self-directed learning, problem solving, ethical conduct in digital environments, and digital citizenship. Digital maturity encompasses individuals' ability to navigate digital tools effectively, use them for learning and personal development, manage technology ethically and responsibly, act with a sense of digital citizenship, and develop critical thinking skills (Awdziej et al., 2023). In this respect, digital maturity is considered within a framework shaped throughout the developmental trajectory from adolescence to adulthood (Hofmans et al., 2024). In particular, it serves as an important indicator for assessing young individuals' capacity to use digital technologies in healthy, productive, and adaptive ways (Hofmans et al., 2024). When discussed within the digital competence framework, digital maturity requires individuals to use digital tools, platforms, and resources not only in terms of technical proficiency but also by integrating ethical, social, and cognitive dimensions. From a sustainability perspective, digital maturity may also promote environmentally conscious behaviors by encouraging individuals to use digital resources more effectively and mindfully—for instance, by participating in online education to reduce physical travel and, consequently, lower their carbon footprints (Awdziej et al., 2023).

A review of the literature indicates that the concept of digital maturity is associated with a range of digital skills, including digital literacy, digital citizenship, and digital well-being (Awdziej et al., 2023; Çelik et al., 2025; Hofmans et al., 2024). Digital literacy refers to individuals' ability to use digital technologies and media tools in meaningful, critical, creative, and safe ways (Martin, 2008; Reddy et al., 2020). Digital citizenship encompasses individuals' responsible, ethical, safe, and effective behavior in digital environments and includes elements such as awareness of digital rights and responsibilities, respectful conduct in online settings, and making positive contributions to the digital world (Choi et al., 2017; De Moraes & De Andrade, 2015). Digital well-being, in turn, refers to individuals' feeling psychologically and physically well by using digital technologies in a balanced, safe, healthy, and purposeful manner (Büchi, 2024; Vanden Abeele, 2021). In this context, digital maturity provides a comprehensive framework that holistically integrates skills such as digital literacy, digital citizenship, and digital well-being, reflecting individuals' capacity not only to use digital technologies but also to manage them ethically, strategically, consciously, and in a balanced manner (Koch et al., 2024; Laaber et al., 2023). In conceptualizing digital maturity, Laaber et al. (2023) described three core capabilities that directly address digital challenges to support young people's positive individual and social development: (1) using digital technologies autonomously and in a self-determined way, (2) coping with increasing digital challenges and solving problems, and (3) engaging adequately with others and contributing to society.

The capacity to use digital technologies autonomously and in a self-determined manner refers to individuals' ability to manage digital tools independently and consciously (Laaber et al., 2023). This competence helps individuals mitigate the adverse effects of digital consumption and enables them to regulate their behaviors in digital environments more effectively (Kozyreva et al., 2020; Turel et al., 2020). In particular, the ability to make one's own decisions and self-regulate one's actions contributes to coping with major challenges of the digital age, such as digital addiction and ethical issues (Yamamoto & Ananou, 2015). The capacity to cope with digital challenges and solve problems, in turn, encompasses individuals' ability to generate effective and creative solutions to problems encountered in digital environments. This capacity is directly associated with individuals' ability to self-direct their learning processes through digital technologies and enhance their academic performance (Laaber et al., 2023; Rashid & Asghar, 2016). Indeed, recent research shows that digital competence increases students' engagement in online learning and supports their psychological well-being (Dunn & Kennedy, 2019; Haleem et al., 2022).

Finally, the capacity to interact effectively with others and contribute to society refers to individuals' strengthening of social ties and active participation in social life through the use of digital technologies (Laaber et al., 2023). Research on the effects of digital technologies on public behavior suggests that negative factors such as social isolation and digital addiction can weaken social interaction (Altanlar et al., 2024; Marsh et al., 2022). However, the conscious and balanced use of these technologies has the potential to enhance social engagement and interaction (Laaber et al., 2023; Wang et al., 2021).

In the related literature, it is evident that most efforts have focused on developing scales designed to assess organizations' levels of digital maturity (Balyer et al., 2023; Begicevic Redjep et al., 2021; Kayabaşı & Kasımoğlu, 2023; Tutar & Erdem, 2024; Zugec et al., 2018). However, the absence of a Turkish scale for measuring individuals' digital maturity points to a significant gap in this field. The cultural adaptation of an instrument with established psychometric properties from another language is widely regarded as a more reliable and time-efficient approach than developing a new scale from scratch (Beaton et al., 2000; Hambleton & Patsula, 1998). Therefore,

the Digital Maturity Scale developed by Laaber et al. (2023) was adapted into Turkish in the present study. Through this process, the study aims to provide a comprehensive assessment tool that can support individuals in developing healthier orientations in their digital lives and participating more effectively in digital transformation processes.

Method

In this study, a quantitative research design was employed to examine the psychometric properties of the Digital Maturity Inventory. Quantitative research aims to obtain objective, measurable, and generalizable results and explains cause–effect relationships based on numerical data (Fraenkel et al., 2012).

Original Structure of the Inventory

The inventory developed by Laaber et al. (2023) is grounded in psychosocial maturity and self-determination theory. The original version of the inventory was developed in English, and its psychometric properties were examined in the 12–18 age group. In addition, Hofmans et al. (2024) administered the scale to a broader sample aged 9–48. The scale uses a five-point Likert format (1 = Never to 5 = Always) and consists of 32 items. It conceptualizes digital maturity through three overarching capacities: (1) the capacity to use digital technologies autonomously and in a self-determined way, (2) the capacity to cope with increasing digital challenges and solve problems, and (3) the capacity to interact sufficiently with others and contribute to society. The inventory includes the following subdimensions: autonomous choice in using mobile devices, autonomy in digital contexts, digital literacy, individual growth in digital contexts, awareness of digital risks, seeking support for digital problems, regulation of negative emotions in digital contexts, regulation of impulses in digital contexts, respect for others in digital contexts, and digital citizenship (Laaber et al., 2023). The autonomy in digital contexts items (Items 1, 2, and 3), regulation of negative emotions in digital contexts items (Items 20, 21, and 22), and regulation of impulses in digital contexts items (Items 23, 24, and 25) include negatively worded statements and are reverse-coded. Higher scores on the inventory indicate higher levels of digital maturity.

Digital technology use is a broad concept that encompasses various devices, services, and patterns of use (Dienlin & Johannes, 2020). The fact that self-reported technology use shows only weak correlations with objective measures raises validity concerns (Lee et al., 2017; Parry et al., 2021; Scharkow, 2016). In particular, grouping different digital technologies under a single category reduces the sensitivity of measurement in this field. To obtain more reliable results, the use of different digital technologies should be examined through objective and detailed assessments (Dienlin & Johannes, 2020). Accordingly, as in the original version of the inventory, the Turkish adaptation process also introduced a restriction by adding the phrase “when using mobile devices…” to the items in the Digital Maturity Inventory.

The adaptation process of the inventory was conducted in accordance with procedures recommended in the literature. This process includes conducting a needs analysis, selecting an appropriate instrument, translating the scale into the target language, performing a back-translation, completing an initial linguistic validation, administering the instrument to the study group, conducting validation procedures, performing reliability analyses, and reporting the results (Hambleton & Patsula, 1998; Perneger et al., 1999). Permission was obtained from the original authors prior to the Turkish adaptation. Following established guidelines, the linguistic adaptation involved forward translation, back-translation, expert review, preparation of a pretest version, and submission of the final form to experts (Beaton et al., 2000). In the forward translation stage, the scale items were translated into Turkish by two experts in information technologies who were fluent in the target language and had a strong understanding of the source language (Beaton et al., 2000; Guillemin et al., 1993). The translated items were then reviewed by four faculty members—two experts in information technologies and two experts from the Department of Educational Measurement and Evaluation—and revised in line with their feedback. The revised items were subsequently examined by two Turkish language experts. In the back-translation stage, the Turkish items were translated back into English and compared with the original scale by two English language experts to ensure semantic equivalence (Beaton et al., 2000). Necessary revisions were made based on the experts’ recommendations. Cognitive interviews were conducted with five students to assess whether the target group understood the items as intended by the scale developers. Participants were asked to verbalize their thoughts while responding to the items, and verbal probing was used to gain deeper insight into their comprehension and decision-making processes (Peterson et al., 2017). In addition, a pilot test was conducted with 25 students to evaluate item clarity and comprehensibility. Following these steps, the Turkish version of the inventory was finalized and deemed ready for administration. To establish nomological/criterion validity, two theoretically related measures were administered: the Digital Literacy Scale and the Mobile Information Security Awareness Scale. The Digital

Literacy Scale, developed by Ng (2012) and adapted into Turkish by Üstündağ et al. (2017), consists of 10 items. The Mobile Information Security Awareness Scale was developed by Erdoğdu et al. (2021) and includes 17 items. These instruments were selected because the Digital Literacy Scale assesses individuals' ability to use digital technologies effectively and safely, while the Mobile Information Security Awareness Scale evaluates awareness of mobile security—both of which are theoretically associated with digital maturity (Laaber et al., 2023).

Study Group

The participants in this study consisted of 923 volunteer undergraduate students enrolled at two universities in Türkiye. However, data from 44 students were excluded because they did not respond correctly to the attention-check item ("To indicate that you have read and understood this sentence, please select 'Never'.") (Kung et al., 2018). Accordingly, all analyses were conducted on data from 879 students. A convenience sampling method was employed to ensure that the data collection process could be carried out efficiently and effectively. Data were collected across three different time points, referred to as T1, T2, and T3. At T1, 348 students completed the questionnaire. This sample size was considered sufficient for conducting CFA, as it exceeded the recommended thresholds for accurate estimation (Hu & Bentler, 1999; Kline, 1994). During the second data collection phase (T2), students from a different university completed the Digital Maturity Inventory along with the Digital Literacy Scale and the Mobile Information Security Awareness Scale. The data obtained from 281 participants were used to assess criterion validity. In the third phase (T3), after a four-week interval, the Digital Maturity Inventory was re-administered to 228 undergraduate students, and test–retest reliability was examined.

Across all phases of data collection, the aims of the study were clearly explained to the participants. Participants were assured that their responses would be used solely for scientific research purposes and would not be shared with third parties. Throughout the process, necessary instructions were provided to facilitate participation in the survey, and sufficient time was allocated for completing the questionnaire. In line with ethical principles, the study ensured the confidentiality and anonymity of all participants' responses. Ethical approval for the instruments used in the study was obtained from the Hatay Mustafa Kemal University Social and Humanities Research Ethics Committee (Decision No. 24, dated January 10, 2025). Table 1 presents information on the participants' demographic profiles.

Table 1. Demographic Information of the Study Group

Variable		Pre-pilot Sample		CFA Sample (T1)		Criterion Validity Sample (T2)		Test–retest Sample (T3)	
		N	%	N	%	N	%	N	%
Gender	Female	9	41.0	235	67.5	196	69.8	158	69.3
	Male	13	59.0	113	32.5	85	30.2	70	30.7
Year of study	1st year	5	23.0	69	19.8	50	17.8	56	24.56
	2nd year	7	32.0	37	10.6	54	19.2	62	27.19
	3rd year	6	27.0	60	17.2	152	54.1	56	24.56
	4th year	4	18.0	182	52.3	25	8.9	54	23.69
	Total	22		348		281		228	

CFA: Confirmatory Factor Analysis

In the pre-pilot sample, 41% of the participants were female and 59% were male. Participants were distributed across four year levels, with the highest participation coming from 2nd-year students (32.0%). In the CFA sample (T1, N = 348), 67.5% of the participants were female and 32.5% were male. In this group, the largest proportion consisted of 4rth-year students (52.3%), while first-year (19.8%), 3rd-year (17.2%), and 2nd-year (10.6%) students were also represented. In the criterion validity sample (T2, N = 281), female participants constituted the majority (69.8%), whereas male participants accounted for 30.2%. In this group, the highest participation rate was observed among third-year students (54.1%). In the test–retest sample (T3, N = 228), 69.3% of participants were female and 30.7% were male. Within this sample, 27.19% of the students were in their second year, 24.56% were in their first year, 24.56% were in their third year, and 23.69% were in their fourth year.

Data Analysis

Across all datasets, missing values were first examined. To assess normality, skewness and kurtosis values were inspected. The skewness and kurtosis values for the CFA, criterion validity, and test–retest datasets indicated that the data were normally distributed (Tabachnick & Fidell, 2013). Confirmatory factor analysis (CFA) was conducted to verify the underlying factor structure of the inventory (Hinkin, 1998). Within the CFA framework, several fit indices were calculated to evaluate model fit, including the chi-square goodness-of-fit ratio (χ^2/df), the goodness-of-fit index (GFI), the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the standardized root mean square residual (SRMR) (Brown, 2015; Harrington, 2009). To indicate good fit, χ^2/df values below 3, CFI and TLI values above .90, and RMSEA and SRMR values below .08 are generally expected (Hu & Bentler, 1999). For convergent validity, the average variance extracted (AVE) and composite reliability (CR) values were calculated. AVE values of at least .50 and CR values higher than AVE are recommended (Fornell & Larcker, 1981). Correlation coefficients of .50 or above between parallel measures are considered acceptable evidence of validity (Cohen, 2013). To assess internal reliability, Cronbach's alpha coefficients were computed, with values above .70 considered sufficient for internal consistency (DeVellis, 2021; Nunnally & Bernstein, 1994). To establish criterion validity, the Digital Literacy Scale and the Mobile Information Security Awareness Scale were administered, and correlation coefficients were calculated. In the third phase, test–retest analysis was conducted to evaluate the temporal stability of the scale. For test–retest reliability, statistical significance at $p < .01$ is typically expected (DeVellis, 2021; Nunnally & Bernstein, 1994), and correlation coefficients above .50 indicate a strong relationship (Cohen, 2013).

Results

This section presents the findings obtained from the study, along with interpretations based on these results.

Underlying Factor Structure

Confirmatory factor analysis (CFA) was conducted to determine the extent to which the factor structure originally proposed for the Digital Maturity Inventory developed by Laaber et al. (2023) fit the version adapted to the Turkish context. Figure 1 presents the CFA model for the Turkish form of the inventory.

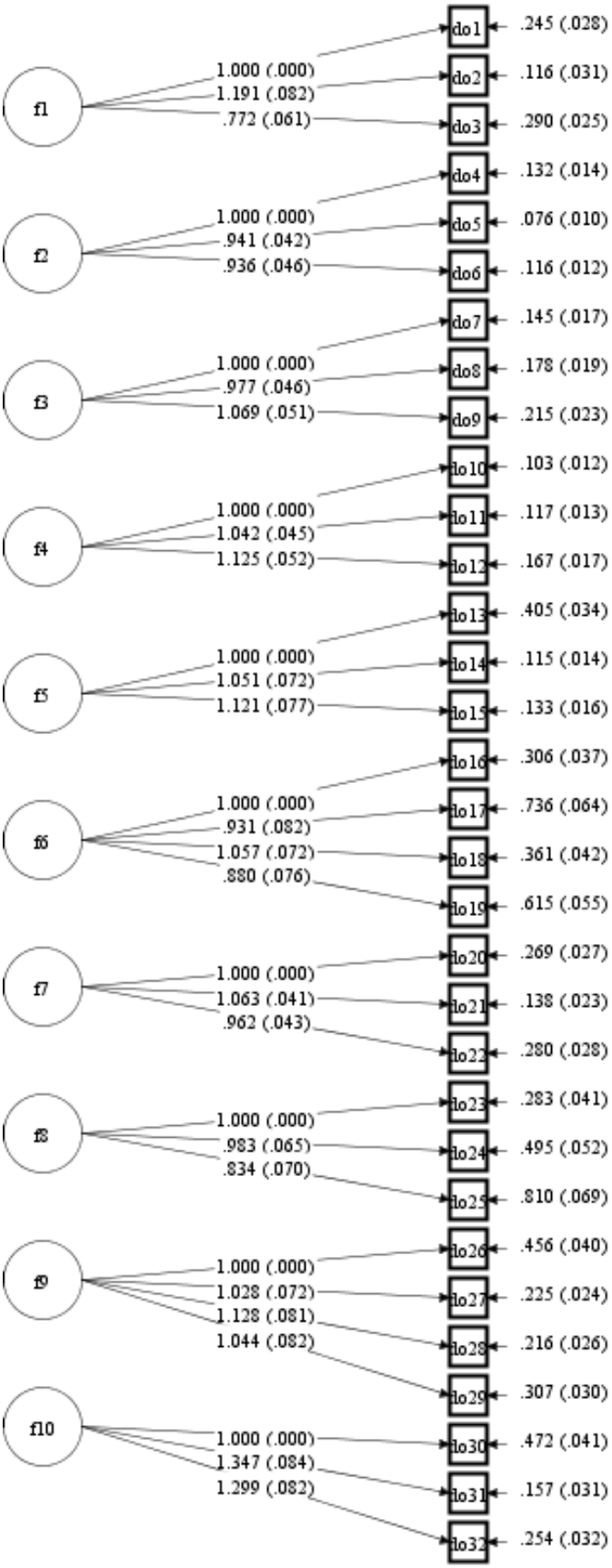

Figure 1. CFA Results for the Turkish Form of the Digital Maturity Inventory

The fit indices obtained from the analysis were $\chi^2/df = 1.91$, RMSEA = .04, CFI = .95, TLI = .94, and SRMR = .04. These values indicate that the model demonstrates good fit. Accordingly, the ten-dimensional structure of the Turkish version of the Digital Maturity Inventory was supported. Standardized estimates of the factor loadings for the Turkish form of the inventory, along with their significance levels, are presented in Table 2.

Descriptive Statistics

Table 2 presents descriptive statistics for the Digital Maturity Inventory, including factor loadings, kurtosis, skewness, means, and standard errors.

Table 2. Factor Loadings and Descriptive Statistics for the Digital Maturity Inventory

Factor		M	SD	Skewness	Kurtosis	Factor Loading	SE	Z	p
Autonomous Choice in Using Mobile Devices	Item1	2.14	0.804	0.501	0.133	0.788	0.023	36.371	0.000
	Item2	2.17	0.828	0.518	-0.108	0.912	0.019	52.149	0.000
	Item3	2.11	0.728	0.085	-0.525	0.672	0.032	21.176	0.000
Autonomy in Digital Contexts	Item4	4.09	0.716	-0.852	1.352	0.862	0.018	49.003	0.000
	Item5	4.17	0.643	-0.632	1.287	0.903	0.015	61.227	0.000
	Item6	4.20	0.670	-0.606	0.666	0.861	0.018	47.796	0.000
Digital Literacy	Item7	4.16	0.828	-0.835	0.221	0.887	0.016	55.251	0.000
	Item8	4.23	0.833	-1.097	1.002	0.862	0.018	48.620	0.000
	Item9	4.05	0.912	-0.755	-0.107	0.861	0.018	48.186	0.000
Individual Growth in Digital Contexts	Item10	4.21	0.707	-0.880	1.263	0.891	0.015	58.305	0.000
	Item11	4.14	0.740	-0.788	1.041	0.887	0.015	57.751	0.000
	Item12	4.07	0.818	-0.890	0.962	0.866	0.017	50.964	0.000
Digital Risk Awareness	Item13	3.87	0.881	-0.384	-0.366	0.691	0.031	22.087	0.000
	Item14	4.36	0.724	-0.986	0.701	0.883	0.017	52.132	0.000
	Item15	4.28	0.774	-1.052	0.988	0.882	0.017	51.979	0.000
Seeking Support for Digital Problems	Item16	3.88	0.947	-0.700	-0.054	0.811	0.027	29.566	0.000
	Item17	3.30	1.117	0.144	-1.202	0.639	0.038	16.982	0.000
	Item18	3.87	1.010	-0.863	0.301	0.803	0.027	29.653	0.000
	Item19	3.66	1.036	-0.577	-0.274	0.652	0.037	17.747	0.000
Regulation of Negative Emotions in Digital Contexts	Item20	2.26	1.097	0.630	-0.426	0.881	0.013	67.033	0.000
	Item21	2.16	1.092	0.767	-0.220	0.940	0.010	96.205	0.000
	Item22	2.17	1.070	0.737	-0.186	0.869	0.016	55.567	0.000
Regulation of Impulses in Digital Contexts	Item23	2.08	1.032	0.770	-0.179	0.857	0.023	38.003	0.000
	Item24	2.18	1.119	0.753	-0.239	0.777	0.026	29.846	0.000
	Item25	2.34	1.165	0.523	-0.689	0.633	0.035	19.011	0.000
Respect for Others in Digital Contexts	Item26	3.99	0.950	-0.662	-0.469	0.702	0.032	21.972	0.000
	Item27	4.13	0.834	-0.757	0.039	0.822	0.023	35.167	0.000
	Item28	4.22	0.884	-1.070	0.716	0.851	0.021	40.823	0.000
	Item29	4.23	0.890	-1.201	1.307	0.782	0.026	30.704	0.000
Digital Citizenship	Item30	3.64	0.999	-0.333	-0.515	0.723	0.029	25.001	0.000
	Item31	3.51	1.048	-0.378	-0.464	0.926	0.016	58.231	0.000
	Item32	3.52	1.063	-0.375	-0.553	0.880	0.018	49.921	0.000

As shown in Table 2, the factor loadings of the items in the inventory ranged from 0.633 to 0.940, and all loadings were statistically significant. Table 3 presents the results of the correlation analysis examining the relationships among the subdimensions of the scale.

Table 3. Correlations Among the Subdimensions of the Digital Maturity Inventory

Factors	1	2	3	4	5	6	7	8	9	10	11
1. Digital Maturity Inventory (total)	1										
2. Autonomous Choice in Using Mobile Devices	.222**	1									
3. Autonomy in Digital Contexts	.585**	-.090	1								
4. Digital Literacy	.612**	-.006	.582**	1							
5. Individual Growth in Digital Contexts	.664**	-.006	.557**	.600**	1						
6. Digital Risk Awareness	.691**	.004	.564**	.639**	.666**	1					
7. Seeking Support for Digital Problems	.615**	-.082	.338**	.329**	.352**	.412**	1				
8. Regulation of Negative Emotions in Digital Contexts	.273**	.183**	-.150**	-.128*	-.112*	-.192**	.031	1			
9. Regulation of Impulses in Digital Contexts	.257**	.251**	-.131*	-.141**	-.166**	-.158**	.049	.656**	1		
10. Respect for Others in Digital Contexts	.623**	-.041	.422**	.367**	.442**	.497**	.354**	-.130**	-.180**	1	
11. Digital Citizenship	.601**	.054	.218**	.181**	.356**	.382**	.356**	.002	-.007	.453**	1

According to the correlation analysis, the Digital Maturity Inventory total score was positively and significantly associated with all subdimensions. The strongest relationships were observed with digital risk awareness (r = .691), individual growth in digital contexts (r = .664), and digital literacy (r = .612). Seeking support for digital problems (r = .615), autonomy in digital contexts (r = .585), and respect for others in digital contexts (r = .623) also showed significant, moderate associations with digital maturity. In contrast, autonomous choice in using mobile devices (r = .222), regulation of negative emotions in digital contexts (r = .273), and regulation of impulses in digital contexts (r = .257) exhibited relatively weaker relationships. Overall, these findings indicate that the total score is meaningfully related to each subdimension and support the multidimensional nature of digital maturity.

Criterion-Related Validity

To examine the criterion-related validity of the Digital Maturity Inventory, the Digital Literacy Scale and the Mobile Information Security Awareness Scale were used. A correlation analysis was conducted to determine the relationships among the scales, and the findings are presented in Table 4.

Table 4. Correlations for the Criterion-Related Validity of the Digital Maturity Inventory

	Digital Literacy Scale	Mobile Information Security Awareness Scale
Digital Maturity Inventory (Total)	.563**	.591**

**p<.01

As shown in Table 4, the Digital Maturity Inventory was positively and significantly correlated with the Digital Literacy Scale (r = .563, p < .01) and the Mobile Information Security Awareness Scale (r = .591, p < .01).

Reliability

To evaluate the reliability of the Digital Maturity Inventory, Cronbach's alpha internal consistency coefficients were calculated using the CFA sample. In addition, the test–retest method was employed to examine the temporal stability of the instrument. The findings are presented in Table 5.

Table 5. Reliability Estimates for the Digital Maturity Inventory

Factors	Cronbach's α (CFA sample)	CR	AVE	Test–retest method
1. Digital Maturity Inventory	0.866	0.985	0.681	.875**
2. Autonomous Choice in Using Mobile Devices	0.831	0.837	0.635	.801**
3. Autonomy in Digital Contexts	0.905	0.908	0.766	.862**
4. Digital Literacy	0.902	0.903	0.756	.702**
5. Individual Growth in Digital Contexts	0.910	0.913	0.777	.710**
6. Digital Risk Awareness	0.846	0.862	0.678	.824**

7. Seeking Support for Digital Problems	0.814	0.819	0.534	.723**
8. Regulation of Negative Emotions in Digital Contexts	0.929	0.931	0.818	.742**
9. Regulation of Impulses in Digital Contexts	0.810	0.818	0.603	.898**
10. Respect for Others in Digital Contexts	0.864	0.869	0.626	.854**
11. Digital Citizenship	0.876	0.883	0.718	.865**

**p<.01

According to the results, the Cronbach's alpha internal consistency coefficient for the Digital Maturity Inventory was .866. The Cronbach's alpha coefficients for the subdimensions ranged from .810 to .929, indicating a high level of internal consistency. In addition, the test–retest method was used to examine whether the Digital Maturity Inventory produced consistent results over time. This analysis was conducted with data collected from 228 university students randomly selected from the CFA sample, with a four-week interval between administrations. The correlation coefficient between the two administrations was .875 for the total inventory score and ranged from .702 to .865 for the subdimensions. Moreover, the composite reliability (CR) value, calculated to evaluate overall reliability, was .985, and the average variance extracted (AVE) value, calculated to assess convergent validity, was .681. Taken together, these findings indicate that the Digital Maturity Inventory is a highly reliable measurement instrument.

Ethics approval notification

Ethical permission (10.01.2025–24) was obtained from the Hatay Mustafa Kemal University Social and Humanities Research Ethics Committee for this research on January 10, 2025, with Decision Number 24.

Discussion and Conclusion

The purpose of this study was to establish the validity and reliability of the Turkish version of the Digital Maturity Inventory developed by Laaber et al. (2023) for assessing students' levels of digital maturity. Examining the psychometric properties of the scale demonstrates its suitability for adaptation to the Turkish cultural context and its potential to measure individuals' digital maturity levels.

A quantitative research design was employed in this study, and data were collected from 879 undergraduate students enrolled at two universities in Türkiye using a convenience sampling method. Data collection was conducted across three time points (T1, T2, and T3). At T1, confirmatory factor analysis (CFA) was performed. At T2, for criterion validity, the inventory was administered together with the Digital Literacy Scale and the Mobile Information Security Awareness Scale. At T3, test–retest reliability was evaluated. In the data analysis process, missing data and distributional normality were first examined. The underlying factor structure of the scale was then confirmed via CFA, and model fit indices (χ^2/df, GFI, RMSEA, CFI, and SRMR) were evaluated. For convergent validity, AVE and CR values were calculated, and parallel test analyses were conducted to assess criterion validity. Internal consistency was examined using Cronbach's alpha coefficients.

The CFA results indicated that the original ten-subdimension structure of the scale was also supported in the Turkish sample. The subdimensions Autonomous Choice in Using Mobile Devices, Regulation of Negative Emotions in Digital Contexts, and Regulation of Impulses in Digital Contexts consist of negatively worded items. These items were reverse-coded when calculating the total score. The fit indices obtained from the CFA were within acceptable ranges (Brown & Moore, 2012; Hu & Bentler, 1998), indicating that the inventory is appropriate for assessing individuals' levels of digital maturity in Türkiye. Correlation analyses among the subdimensions of the Digital Maturity Inventory revealed significant associations across all subdimensions, supporting the multidimensional nature of digital maturity. Convergent validity analyses further demonstrated that AVE and CR values were at acceptable levels (Fornell & Larcker, 1981). Criterion validity analyses showed that the Digital Maturity Inventory was significantly related to the Digital Literacy Scale and the Mobile Information Security Awareness Scale, suggesting consistency with other instruments measuring theoretically similar constructs. Reliability analyses indicated that Cronbach's alpha coefficients exceeded .70, demonstrating high internal consistency and coherence among items. Test–retest reliability was also found to be acceptable, indicating that the scale provides stable measurements over time.

Digital maturity encompasses individuals' competencies to use digital technologies consciously, responsibly, and effectively. In today's world, where digital technologies are increasingly pervasive across all areas of life, determining individuals' levels of digital maturity has become an important necessity. In this context, the subdimensions included in the Turkish-adapted inventory capture distinct facets of digital maturity. Autonomous choice in using mobile devices refers to individuals' ability to make decisions about mobile device use independently of external influences (Nikou & Economides, 2017; Ye & Kankanhalli, 2018). Autonomy in digital

contexts points to individuals' capacity to set their own goals in digital environments and act in line with those goals (Boud, 2012). Digital literacy encompasses individuals' competencies to accurately understand, evaluate, and effectively use digital content (Dobson & Willinsky, 2009). Individual growth in digital contexts is based on individuals' ability to use digital tools efficiently for personal and professional development (Gamrat & Zimmerman, 2021). Digital risk awareness involves recognizing potential threats in online environments and being aware of the precautions needed to address these threats (Galinec & Luić, 2020; Tirocchi et al., 2022). Seeking support for digital problems refers to individuals' competencies to identify appropriate sources of help and benefit from these resources when encountering problems in digital environments (Pan et al., 2020). Regulation of negative emotions in digital contexts captures individuals' ability to manage negative emotions such as stress and anxiety experienced in digital environments (Gianesini & Brighi, 2015; Van Deursen et al., 2015). Regulation of impulses in digital contexts involves individuals' capacity to manage immediate and uncontrolled reactions, particularly those that may arise on platforms such as social media (Uppal, 2024; Zahrai et al., 2022). Respect for others in digital contexts reflects individuals' responsibility to engage in online interactions with empathy and to act within the framework of civility and ethical norms (Bollen, 2024; Marín-López et al., 2019). Finally, digital citizenship refers to individuals' acting as informed digital citizens who are aware of their rights and responsibilities in digital environments and who contribute to society (Richardson & Milovidov, 2019). Each of these subdimensions represents a different aspect of digital maturity and collectively contributes to individuals' ability to adopt a balanced, ethical, and conscious stance in digital life (Laaber et al., 2023). The Turkish version of the Digital Maturity Inventory provides an important tool for researchers and educators who aim to assess university students' digital competencies. The inventory can be used to evaluate the effectiveness of digital skills development programs, digital literacy training, and other educational interventions implemented in universities. Moreover, universities may use this inventory to identify students' levels of digital maturity and to design course content or workshops aimed at enhancing these competencies. Overall, this study is expected to make a meaningful contribution to research on digital maturity in higher education in Türkiye.

Limitations

Although the Turkish adaptation of the Digital Maturity Inventory demonstrates the required psychometric properties, the present study has several limitations. These limitations also offer valuable directions for future research. First, because the sample consisted of students from only two universities in Türkiye, future studies may further examine the psychometric properties of the instrument using larger and more diverse samples. Second, because the data were collected solely through self-report measures, social desirability bias may have influenced the results; therefore, future research is encouraged to employ alternative data collection methods (e.g., behavioral or objective indicators). Third, this study did not test the longitudinal (temporal) invariance of the inventory. Given the rapid pace of technological change, students' levels of digital maturity may vary over time or depending on the type of technology used. Accordingly, the items in the inventory may need to be updated to better reflect such changes. Finally, because this study assessed digital maturity primarily with a focus on mobile technologies, future instruments could be developed to also incorporate emerging contemporary technologies, including artificial intelligence.

Ethical Approval

Ethical approval for this study was granted by the Hatay Mustafa Kemal University Social and Humanities Research Ethics Committee on January 10, 2025, under Decision Number 24.

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