Exploring Undergraduates' Digital Citizenship Levels: Adaptation of the Digital Citizenship Scale to Turkish*

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ABSTRACT

This study reports the results of two successive studies on digital citizenship. 'Study I' aims to adapt the Digital Citizenship Scale, developed by Choi, Glassman and Cristol (2017), into Turkish context, and 'Study II' examines undergraduates' levels of digital citizenship with respect to the variables of age, faculty, gender, amount of daily computer use, amount of daily smartphone use, and self-evaluations as to their skills levels of digital technology use. In Study I, the adaptation process of the scale, and validity and reliability analyses are provided based on data obtained from 272 undergraduates from 8 different universities in Turkey. A valid and reliable 18-item adapted form of Digital Citizenship Scale is offered in this part. In Study II, a survey design study, data were obtained from 220 undergraduates from a state university in Turkey and their digital citizenship levels were examined with respect to various variables. It was found out that the participating undergraduates had a medium level of digital citizenship, and they had the lowest mean in Internet Political Activism and the highest mean in Technical Skills. A significant difference between the undergraduates' levels of digital citizenship was found only for self-evaluations as to their skills levels of digital technology use but not for the variables of age, faculty, gender, amount of daily computer use, and amount of daily smartphone use. Results are discussed, and implications are suggested.

Keywords: Digital citizenship, Scale adaptation, Undergradutes, Validity, Reliability

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INTRODUCTION

The rapid advances in information and communication technologies (ICTs) in the recent years have transformed individuals' lifestyles. The digital tools and platforms offered by these technologies have centred in individuals' lives and they have become an indispensable part of people, particularly the young adults. Despite the advantages of ICTs, they involve a number of risks, as well. Therefore, individuals need new skills to make the best use of new technologies, avoid their risks, and participate to the social life through them. That is to say, individuals need to be digital citizens in order for them to be active citizens in the new century.

Identifying individuals' digital citizenship levels and designing interventions for their inadequate aspects based on this identification are quite significant in the context of education policies which aim to raise students that are equipped with 21st century skills. With this notion, the literature accommodates some digital citizenship scales. Regarding Turkey, while some of these scales address a limited group such as secondary school students or pre-service teachers, some other scales are in relation with some courses offered at schools. On the other hand, Choi, Glassman and Cristol (2017) argue that the previous scales on digital citizenship focus on culturally defined behaviours that were transferred to online media and their psychological and sociological theoretical backgrounds are limited. Hence, they developed a new digital citizenship scale based on three theoretical frameworks which are Feenberg's (1991) critical approach to

technology, Castell's (1996) ideas of a networked society and Open Source approach to educative processes. This Likert type scale includes the factors of internet political activism, technical skills, local/global awareness, critical perspective and networking agency. The authors in this study think that these factors are really important for digital citizenship because it dwells on activism and critical thinking. Activism and critical thinking are significant in the digital era. Because beside communication and receiving information through digital technologies, digital citizens need to be competent issues requiring higher level thinking skills (Som Vural & Kurt, 2018). This aspect of the scale differentiates it from other scales that focus on technical aspects of digital citizenship.

The current study includes two sucessive studies. 'Study I' describes the adaptation of the digital citizenship scale, developed by Choi, Glassman and Cristol (2017), to Turkish language. This study reports the validity and reliability tests of the adaptation including translation of the scale, language equivalency, construct validity through confirmatory factor analysis and reliability. 'Study II' reports the findings of a second implementation of the scale to another sample which include the levels of undergraduates' digital citizenship and how they differed by the variables of age, faculty, gender, amount of computer use, amount of smartphone use and self-evaluation as to their skills levels of digital technology use.

LITERATURE REVIEW

Due to some reasons such as rapid advancements in technology, surpassing countries' frontiers through these technologies, globalization, need to use technological tools and platforms to fulfil individuals' needs and rights, the concept of digital citizenship has gained prominence. A perception of citizenship depending on physical boundaries of countries has disappeared with globalization and advancements in technology, and people all around the world can use the same technological platforms, enabling digital citizenship with equal rights and responsibilities across the world (Çubukçu & Bayzan, 2013). Besides, digital communication mediates citizenship practices such as interaction with political parties, getting news feed through web sites, and governmental issues (Shelley et al., 2004). Just like in many countries, electronic state applications and online platforms in Turkey offer government services to individuals. In addition, digital citizenship is also significant for teachers since students are exposed to digital tools to a great extent both in school and at home. So, digital citizenship represents 'appropriate and responsible use of technology in the educational field' (Ribble, 2012, p.149). Accordingly, the International Society for Technology in Education (ISTE) included digital citizenship into technology standards in 2008 (ISTE, 2008). These factors make digital citizenship an indispensable part of people, that's why it should be elaborated on.

One of the most widely-accepted definition of digital citizenship defines it as "norms of appropriate, responsible behaviour with regard to technology use" (Ribble & Bailey, 2007, p.10). Rible and Bailey (2007) also provides a framework for digital citizenship including nine elements, which make this definition more concrete and operationalized. This framework posits that the elements of digital citizenship include digital access, digital commerce, digital etiquette, digital communication, digital law, digital rights and responsibilities, digital literacy, digital security, digital health and wellness. Regarding educational contexts, these elements affect student learning and academic performance, their behaviours and school environment, and students' lives outside the school, which, all together, aim to improve learning outcomes and raise 21st century citizens (Ribble, 2011).

Similarly, Moosberger, Tolbert and McNeal (2007) defines digital citizens as "those who use the internet regularly and effectively". According to the 2016 ISTE standards for students, a digital citizen is aware of his/her rights, responsibilities and opportunities of the digital environments, and their actions are safe, legal and ethical (ISTE, 2016). Such a use requires critical thinking abilities because of the risks of the online environments are a lot and change rapidly. Though there are benefits of digital citizenship such as virtual expansion of digital public space and civil society, increased horizontal organization, strong globalization, anonymization, the weakening of central governments, preventing bureaucracy, formation of public policies with multiple actors (Işıklı, 2015), there are a number of risks associated with digital environments such as internet scams, cyberbullying, misuse of social networking sites, technology related addictions, viruses, or other content, contact or commercial risks. Therefore, students need to be educated to be able to make

thoughtful and critical decisions in risky situations (Oxley, 2010; Valcke et al., 2010). As the risks are always transforming into new forms in the digital environments, critical use of digital media is of the essence.

Choi, Glassman and Cristol (2017) offer a comprehensive theoretical framework for digital citizenship including Feenberg's (1991) critical approach to technology, Castells' (1996) ideas of a networked society, and Open Source approach to educative processes. Based on Feenberg's ideas of autonomous perspective and a human controlled perspective towards technology, Choi, Glassman and Cristol (2017) regard the internet as a paradox of either as a tool for manipulating society to enable hegemonic systems of governance or as a tool allowing for participatory expression and critique of traditional institutions. According to Castells's networked society idea, the flow of information in the internet enables powerful hubs to manipulate and control spaces of places, thereby highlighting responsibility in digital citizenship. Lastly, the Open Source initiative features development of individuals skills for prominent use of digital tools. Based on these three theoretical foundations, Choi, Glassman and Cristol (2017) developed the digital citizenship scale, which is aimed to be adapted to Turkish in the current study.

There are some digital citizenship scales used in the Turkish context. One of them was developed by Elçi (2015); however, it was developed with the aim to examine the curriculum of Information Technology and Software course in lower secondary school level in the context of digital citizenship. Another scale was developed by Isman and Canan Güngören (2014). Their scale was based on Ribble and Bailey's (2007) digital citizenship touchpoints and developed with teacher candidates. The scale developed by Kocadağ (2012) addresses teacher candidates and includes 63 items. Karaduman (2011) developed a 32-item digital citizenship attitude scale addressing lower secondary school students. Öztürk (2015) also developed a 31-item scale to determine the digital citizenship levels of lower secondary school students. Som Vural and Kurt (2018) developed a scale of 23 items to determine the digital citizenship levels of university students. While some of these scales address a limited group such as secondary school students or pre-service teachers, some other scales are in relation with some courses offered at schools. The authors highlight the need for critical thinking and participation in digital citizenship scales as opposed to technical skills needed in digital environments. Therefore, the scale by Choi, Glassman and Cristol (2017) was selected due to its focus on criticality, activism and agency as well as its underlying theoretical foundations.

Though there are theoretical, descriptive or correlational studies with respect to digital citizenship in the international literature (Al-Zahrani, 2015; Hill, 2015; Lyons, 2012; Oyedemi, 2012; Richards, 2010; Shelley et al., 2004; Xu, Yang, MacLeod, Zhu, 2018), studies aiming at identifying participants' levels of digital citizenship in Turkey mostly address K-12 students or a specific group of participants, and such studies with undergraduates are limited. However, according to the statistics, undergraduates, or young adults, are among the age groups using the internet and social media most in Turkey (Hootsuite, 2019) and they are more vulnerable to technological addictions, smartphone addiction in particular (Kwon et al., 2013).

While the studies in Turkish context focus on K-12 level, some other studies are carried out with pre-service teachers. Elçi (2015) investigated the views of lower secondary school students' views about information technology and software course in the context of digital citizenship. Çepni, Oğuz and Kılcan (2014) examined elementary school students' attitudes towards digital citizenship. Karaduman (2011) examined digital citizenship within the context of a course at lower secondary school level, and Öztürk (2015) identified lower secondary school students' digital citizenship levels. With respect to pre-service teachers, Görmez (2016) and Kaya and Kaya (2014) investigated teacher candidates' opinions and perceptions regarding digital citizenship through interviews. Kocadağ (2012) and Isman and Canan Güngören (2013) examined pre-service teachers' digital citizenship levels. Sakallı (2015) explored the relationship between pre-service primary schools' levels of digital citizenship and cyberbullying tendencies. Rather than specific groups, studies with undergraduates from various departments are quite limited. Som Vural and Kurt (2018) examined undergraduates' digital citizenship levels with respect to some variables. In addition, Elçiçek, Erdemci and Karal (2018) examined the relationship between the levels of digital citizenship and social presence for the graduate students. These studies are significant in that they provide rich data for designing interventions to increase students' levels of digital citizenship, but it is evident that more studies are needed with respect to the levels of digital citizenship of students at tertiary level.

Purpose of the Study

This study aims to adapt the digital citizenship scale, developed by Choi, Glassman and Cristol (2017), into Turkish context, and examine undergraduates' levels of digital citizenship with respect to the variables of age, faculty, gender, amount of daily computer use, amount of daily smartphone use, and self-evaluations as to their skills levels of digital technology use. Accordingly, there are three research questions in the current study which are:

1. Is the adapted form of the 'Digital Citizenship Scale' a valid and reliable instrument? (Study I)
2. What are the levels of undergraduates' digital citizenship and its sub-dimensions? (Study II)
3. Are there any differences between the levels of undergraduates' digital citizenship in terms of age, faculty, gender, amount of computer use and smartphone use, and self-evaluation as to their skills levels of digital technology use? (Study II)

STUDY I

RESEARCH METHOD

Study I employed a survey research design in the adaptation of Digital Citizenship Scale into Turkish context. In survey research design, 'investigators administer a survey to a sample or to the entire population of people to describe the attitudes, opinions, behaviors, or characteristics of the population' (Creswell, 2012, p.376). The data were collected through an online survey and confirmatory factor analysis was carried out for construct validity and correlations were calculated for reliability.

Participants

The participants in Study I consisted of 272 students studying at 7 different faculties of 8 different universities at various regions of Turkey. The reason for resorting to participants from different universities and departments was to enable diversity in the sample and strengthen the validity of the adaptation study through representing students with different backgrounds and experiences. The participants were selected through convenience sampling method, in which available and volunteering participants are employed (Creswell, 2002). While 63.6% of the students were female (173), 36.4% of them were male (99). The participants' ages varied between 18 and 57, and 89.7% of them were between 18-23 range. The students were attending education (32.7%), economics and administrative sciences (21%), engineering (16.2%), sciences (14%), tourism (8.5%), fine arts (5.1%) and law (2.6%) faculties.

Instrument

Developed by Choi, Glassman and Cristol (2017), the 'Digital Citizenship Scale' consists of 26 items. There are five factors of the scale which are 'Internet Political Activism' (9 items), 'Technical Skills' (4 items), 'Local/Global Awareness' (2 items), 'Critical Perspective' (7 items), and 'Networking Agency' (4 items). The authors reported that the Cronbach alpha was .88 for the entire scale, and the Cronbach's alphas were .83, .84, .89, .80, and .67 for the factors respectively. The confirmatory factor analysis of the scale indicated a moderate to good fit.

Procedure

In May 2018, the authors of the scale were asked for permission to adapt the scale into Turkish language. After getting the permission, the scale was translated to Turkish by three language specialists. The authors and translators discussed on the Turkish translation of the scale and agreed on a draft form. Two different specialists back translated the draft form to English and they were compared with the original scale.

Then the draft scale was sent to another expert who had specialization both in the two languages and technology and education field. After the revisions, the draft form was examined by two Turkish language specialists to check the spelling, punctuation, meaning and intelligibility. After this phase, a focus group discussion was held with 14 university students in which they responded the items first and then they talked about the items one by one as to their intelligibility and meaning. Following this discussion, the Turkish form of the scale was finalized. To put forth the language equivalency of the adapted scale, 3rd grade students studying at English Language Teaching department of a state university in Turkey took the original scale. These students were selected because they were proficient both in Turkish and English. Three weeks later, the same students took the Turkish form of the scale. In the two measurements, the correlations were found significant varying at .61 and .78 levels for the factors and the entire scale ($p<.05$). After approval of language equivalency, the scale was sent to students at various universities in Turkey through online survey method and 272 students' responses were included in the analysis.

RESULTS

In this section, findings with respect to the validity and reliability of the scale are provided. Confirmatory factor analysis (CFA) was carried out for factor analysis and Cronbach's alpha and Pearson correlations were calculated for reliability.

Item Discrimination

Item-total correlations were calculated to show the item discrimination. The observed values are given in Table 1. The minimum level for item-total correlation value is .30 (Field, 2009). As seen in the table, only items 10 and 11 are slightly below .30 but as they are very close to .30, the correlation is significant ($p<.01$), and there is theoretical support for these items, all items were kept.

Table 1. Item-total Correlation Values

Item no	*r*	Item no	*r*	Item no	*r*
Item 1	.57**	Item 10	.29**	Item 19	.63**
Item 2	.53**	Item 11	.29**	Item 20	.51**
Item 3	.54**	Item 12	.30**	Item 21	.60**
Item 4	.59**	Item 13	.36**	Item 22	.67**
Item 5	.54**	Item 14	.60**	Item 23	.60**
Item 6	.64**	Item 15	.56**	Item 24	.47**
Item 7	.60**	Item 16	.59**	Item 25	.55**
Item 8	.41**	Item 17	.61**	Item 26	.61**
Item 9	.52**	Item 18	.73**		

**$p < .01$, *$p < .05$ $n = 272$.

Construct Validity: Confirmatory Factor Analysis Results

Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was performed to test the adequacy of the sample. KMO value was calculated as .887 in this study which is regarded as high in the literature (Tavsancil, 2006). The CFA was carried out to test the model in the original scale fitted to the data set with the adapted form. In the CFA, items 6, 7, 8, 17, 20, 21, 22 and 24 were omitted from the scale due to modification suggestions to enable a significant decrease in chi-square value and prevent overlapping items. The number of the items of the last form is 18. Then the t values were checked, and it was observed that all of them were above 2.56 and therefore significant ($p<.01$). The diagram of the confirmatory factor analysis indicating the factors and related items is provided in Figure 1.

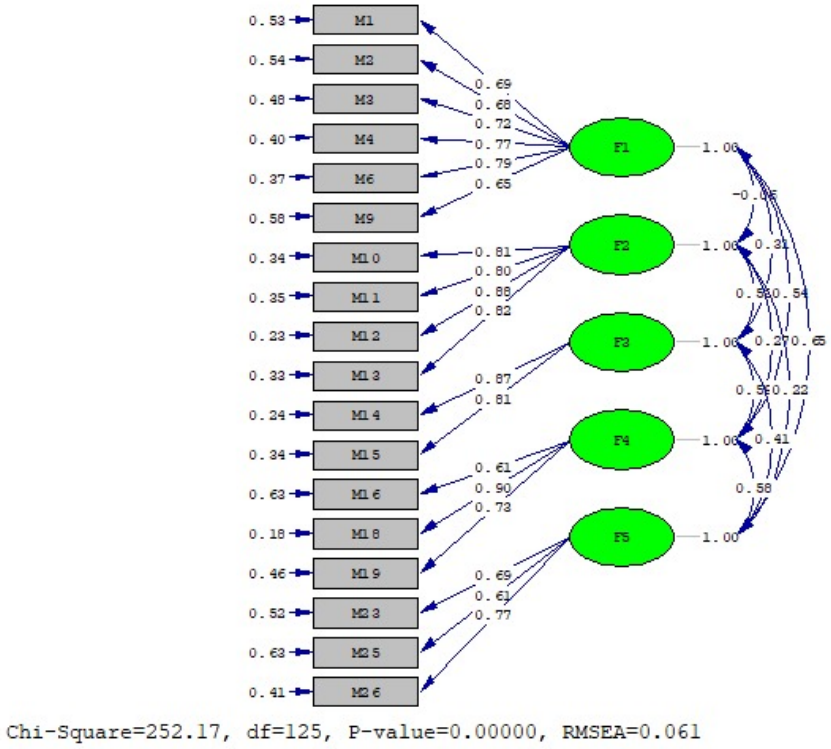

Figure 1. Confirmatory factor analysis diagram

The fit indices were checked in the analysis. First, the ratio of degree of freedom (125) to chi-square value (252.17) indicated a good fit (χ2/df=2.01). The other fit indices and cut-off values are presented in Table 2. As seen in Table 2, Goodness-of-Fit Index (GFI: .99), Adjusted Goodness-of-Fit Index (AGFI: .98), Normed Fit Index (NFI: .83), Root Mean Square Error of Approximation (RMSEA: .061) and Standardized Root Mean Square Residual (SRMR: .046), and Parsimony Normed Fit Index (PNFI: .68) were found within the acceptable thresholds. Only Comparative Fit Index (CFI: .85) was found slightly below the threshold; however, the value is very close to .90 and it was calculated as .89 in the original scale. Therefore, it can be suggested that the data show a good fit with the model.

Table 2. Fit indices and cut-off values

Index	Observed Value	Cut-Off Value
GFI	.99	≤ 3 (Schermelleh-Engel et al., 2003)
AGFI	.98	≥ .90 (Hair et al., 2006; Schermelleh-Engel et al., 2003)
NFI	.83	≥ .80 (Marsh et al. 1988; Bentler & Bonett, 1980)
RMSEA	.061	≤ .08 (Schermelleh-Engel et al., 2003)
CFI	.85	≥ .90 (Bentler, 1990; Schermelleh-Engel et al., 2003)
SRMR	.046	≤ .08 (Schermelleh-Engel et al., 2003)
PNFI	.68	≥ .50 (Mulaik et al. 1989)
PGFI	.72	≥ .60 (Byrne, 2010)

Reliability

It was found out that Cronbach alpha value of the scale is (α=.87), which refers to a high reliability. The Cronbach's alpha coefficients of the factors of the scale as well as the correlations between the factors are provided in Table 3.

Table 3. Reliability of the scale and correlations among factors

Factors	Alpha Value	Correlations btw. factors					
		1	2	3	4	5	Total
Internet Political Activism'	.86	1	-.13	.26	.46	.49	.74
Technical Skills	.93		1	.44	.22	.15	.39
Local/Global Awareness	.83			1	.49	.31	.66
Critical Perspective	.61				1	.43	.77
Networking Agency	.73					1	.73
Total	.87						1

In the interpretation of the alpha values, values ≥ .60 refer to acceptable reliability, values ≥ 70 refer to high reliability, and values ≥.90 refer to very high reliability (Özdamar, 2011). Accordingly, the reliability values of the factors vary between acceptable and very high reliability.

STUDY II

RESEARCH METHOD

Study II employs a survey research design. Surveys involve obtaining data from a sample representing the population to identify trends, attitudes or opinions quantitatively (Creswell, 2012). Survey model was preferred in the study because it is aimed to identify undergraduates' levels of digital citizenship with respect to some variables based on their self-evaluations.

Participants

The participants in Study II consisted of 220 students studying at education (131) and technology (89) faculties of a state university in Turkey. The participants were selected through convenience sampling method, in which available and volunteering participants are employed (Creswell, 2012). Of the participants, 39 are 18 years old (17.7%), 67 are 19 (30.5%), 69 are 20 (31.4%), 28 are 21 (12.7%), and 17 are 22 and above years old (7.7%). While 120 of them are female (54.5%), 100 of them are male (45.5%).

Instrument

Digital citizenship scale, developed by Choi, Glassman and Cristol (2017) and adapted to Turkish context by the researchers was used as the instrument in the study. The undergraduates took the 18-item scale, characteristics of which is explained in Study I, in a paper-pen format. A personal information form was also added to the scale which included items as to age, gender, faculty, amount of daily computer use, amount of daily smartphone use, and self-evaluation as to their skills level of digital technology use. The Cronbach alpha value of this study was found as .85 for the total scale and as .82, .91, .80, .87, and .66 for the factors respectively.

Data Analysis

The data were analyzed through a statistical package program. Taking the normality of the data into consideration, either parametric or non-parametric tests were employed. The independent samples t test was used to examine the difference in undergraduates' levels of digital citizenship regarding the variables of

gender and faculty, One-Way ANOVA was used for the variables of age and amount of daily computer use, and Kruskal-Wallis H test was used for the variables of amount of daily smartphone use and skills levels. Mann-Whitney U test was also used for pairwise comparison regarding the skills levels. Descriptive statistics were also employed in various analyses.

RESULTS

What are the levels of undergraduates' digital citizenship and its sub-dimensions?

Descriptive statistics were employed in the identification of the levels of undergraduates' digital citizenship and its sub-dimensions. The results of the analysis are presented in Table 4.

Table 4. Undergraduates' means of digital citizenship

Digital citizenship and its subdimensions	Number of Items	$\bar{X}$	SD
Internet Political Activism	6	2.17	1.13
Technical Skills	4	6.28	1.07
Local/Global Awareness	2	4.75	1.64
Critical Perspective	3	3.93	1.46
Networking Agency	3	3.02	1.42
Digital Citizenship (total)	18	3.80	.86

As seen in Table 4, the undergraduates' means of digital citizenship and its subdimensions vary greatly. The mean of the total scale is 3.80, which can be regarded as medium level. The mean of the first factor, Internet Political Activism, is prominently low ($\bar{X}$= 2.17) when compared to the other factors. The other factor that is below that medium level range is Networking Agency ($\bar{X}$= 3.02). The factor of Critical Perspective is at medium level range ($\bar{X}$= 3.93), and the factor of Local/Global Awareness is above medium level range ($\bar{X}$= 4.75), and the mean of Technical Skills is very high ($\bar{X}$= 6.28), meaning they definitely agree with the items. The means of the items are provided in the table below.

Table 5. The means of the items in the scale

Items	$\bar{X}$	SD
1. Yerel, yaşadığım şehir ya da okulla ilgili konular hakkında politik buluşmalara ya da halk toplantılarına çevrimiçi olarak (internet üzerinden) katılırım.	2.16	1.46
2. Yerel, ulusal ya da küresel meseleleri çözmek için diğer insanlarla internet üzerinden çalışma yürütürüm.	2.24	1.55
3. Sosyal, kültürel, politik veya ekonomik konularda internet üzerinden imza kampanyaları düzenlerim.	1.71	1.25
4. Politik ya da sosyal meselelerle ilgili görüşlerimi internet üzerinden düzenli olarak paylaşırım.	2.38	1.62
5. Politik ve sosyal hususlara ilişkin olarak baskın görüşlere veya statükoya karşı çıkmak için kendi görüşlerimi internet ortamında açıklarım.	2.39	1.72
6. Politik ve sosyal konularla ilgilenen internet gruplarına üyeyimdir.	2.12	1.76
7. İhtiyacım olan bilgiyi bulmak için interneti kullanabilirim.	6.34	1.13
8. Benim için faydalı olan uygulamaları internetten bulabilir ve indirebilirim.	6.30	1.19
9. Amaçlarıma ulaşmak için dijital teknolojileri (akıllı telefon, tablet, bilgisayar vb.) kullanabilirim.	6.40	1.12
10. Dijital teknolojileri (akıllı telefon, tablet, bilgisayar vb.) kullanarak ne zaman istersem internete erişebilirim.	6.09	1.36
11. Politik ya da sosyal konularda interneti kullanarak daha çok bilgi edinirim.	4.96	1.78
12. İnternet kullanımı aracılığıyla küresel meseleler ile ilgili daha fazla farkındalık sahibiyim.	4.53	1.82

13. Adaletsiz ya da haksız olduğunu düşündüğüm bir şeyi değiştirmek için çevrimiçi (internet üzerinden) katılımın etkili bir yol olduğunu düşünüyorum.	4.08	1.81
14. Politik ya da sosyal konulara dahil olmak için çevrimiçi katılımın etkili bir yol olduğunu düşünüyorum.	3.73	1.77
15. Çevrimiçi katılımın internet dışındaki (sosyal ya da politik olaylara) katılımı da teşvik ettiğini düşünüyorum.	3.97	1.75
16. Mümkün olduğunda, ziyaret ettiğim haber sitelerinde, bloglarda veya sosyal medya sitelerinde insanların yazdıklarına yorumlar yaparım.	2.74	1.77
17. Çevrimiçi ortamlarda (İnternet aracılığı ile) insanlarla iş birliği yapmaktan çevrimdışı ortamlara göre daha çok keyif alırım.	2.75	1.67
18. Düşüncelerimi, hislerimi, görüşlerimi ifade etmek için internette özgün mesaj, ses, görüntü ya da videolar paylaşırım.	3.59	2.03

The three items with the lowest means are 3, 6, and 1. These items are about getting into action through digital technologies such as starting digital petitions, being a member of online political groups or participating to online meetings about local or political issues. The items with the highest means are 9,7, and 8, which are technical skills regarding digital technologies. The participating undergraduates think they are technically competent.

Are there any differences between the levels of undergraduates' digital citizenship in terms of age, faculty, gender, amount of computer use and amount of smartphone use, and self-evaluation as to their skills levels of digital technology use?

The difference in digital citizenship levels and its subdimensions in terms of gender

The independent samples t-test was employed to compare the means of undergraduates' digital citizenship in terms of gender as the data were distributed normally regarding gender. The results are provided in Table 6.

Table 6. The independent samples t-test results regarding gender

Variable	Gender	N	X̄	SD	df	t	p
Factor 1	Female	120	2.19	1.12	218	.323	.747
	Male	100	2.14	1.15			
Factor 2	Female	120	6.32	1.12		.569	.570
	Male	100	6.24	1.01			
Factor 3	Female	120	4.67	1.58		-.720	.472
	Male	100	4.84	1.72			
Factor 4	Female	120	4.93	1.50		.033	.973
	Male	100	4.92	1.42			
Factor 5	Female	120	3.16	1.41		1.569	.118
	Male	100	2.86	1.42			
Total	Female	120	3.83	.83		.584	.560
	Male	100	3.77	.89			

The results put forth that though the female undergraduates' means are higher than males' means except for Factor 3, this difference is not significant. Therefore, the undergraduates' levels of digital citizenship and its subdimensions do not differ significantly between gender groups, p>.05.

The difference in digital citizenship levels and its subdimensions in terms of faculty

The independent samples t-test was used to compare the means of undergraduates' digital citizenship in terms of faculty they attend to as the data were distributed normally regarding faculty. The results are provided in Table 7.

Table 7. The independent samples t-test results regarding faculty

Variable	Gender	N	X̄	SD	df	t	p
Factor 1	Education	131	2.22	1.24	218	.830	.407
	Technology	89	2.09	.94			
Factor 2	Education	131	6.22	1.21		-1.010	.314
	Technology	89	6.36	.82			
Factor 3	Education	131	4.67	1.63		-.795	.427
	Technology	89	4.85	1.66			
Factor 4	Education	131	3.84	1.49		-1.017	.310
	Technology	89	4.05	1.43			
Factor 5	Education	131	3.11	1.41		1.139	.256
	Technology	89	2.89	1.41			
Total	Education	131	3.80	.88		-.061	.952
	Technology	89	3.81	.82			

The differences between the means of education faculty students and technology faculty students are not statistically significant, p>.05.

The difference in digital citizenship levels and its subdimensions in terms of age

To compare the means of undergraduates' digital citizenship in terms of age, One-Way ANOVA was performed as the data were distributed normally regarding age. The results of the test are given in Table 8.

Table 8. Descriptive statistics and One-Way ANOVA test results regarding age

Var.	18		19		20		21		22+				
	X̄	SD	X̄	SD	X̄	SD	X̄	SD	X̄	SD	F	p	η2
F1	2.10	1.14	2.23	1.25	2.27	1.07	1.92	.95	2.07	1.16	.559	.55	.72
F2	6.35	.79	6.13	1.26	6.37	1.01	6.14	1.29	6.61	.49	1.031	1.03	1.19
F3	4.70	1.59	4.70	1.64	4.92	1.67	4.48	1.56	4.79	1.87	.405	.40	1.11
F4	3.94	1.38	3.79	1.57	4.19	1.51	3.67	1.17	3.76	1.47	.973	.97	2.1
F5	3.04	1.69	2.94	1.44	3.14	1.32	2.92	1.29	3.00	1.32	.225	.22	.45
Tot.	3.79	.82	3.75	.91	3.94	.86	3.60	.76	3.82	.90	.888	.88	.66

The One-Way ANOVA results put forth that the undergraduates' levels of digital citizenship and its subdimensions do not differ significantly among age groups, p>.05.

The difference in digital citizenship levels and its subdimensions in terms of computer use

The undergraduates were asked how many hours they used a computer in a regular day. The means of undergraduates' amount of daily computer use is given in Table 9. Their answers were grouped as seen in the table.

Table 9. The undergraduates' means of the amount of daily computer use

Var.	0 h		0-1 h		1-2 h		2-3 h		3-4 h		4-5 h		5+ h	
	X̄	SD	X̄	SD	X̄	X̄	X̄	SD	SD	SD	X̄	SD	X̄	SD
F1	2.04	1.21	2.38	1.17	1.96	.93	2.23	.98	2.33	1.48	2.39	1.13	2.50	1.06
F2	6.29	1.12	6.48	.97	6.07	1.08	6.64	.68	6.23	.85	6.53	.68	5.98	1.51
F3	4.78	1.66	4.73	1.68	4.58	1.47	5.03	1.73	4.47	2.03	5.11	1.43	4.67	1.70
F4	3.74	1.49	4.15	1.22	3.79	1.44	4.54	1.40	4.12	1.49	3.71	1.69	3.85	1.46
F5	2.82	1.42	3.55	1.49	2.89	1.36	3.21	1.50	3.37	1.46	2.38	1.14	3.46	1.30
Tot.	3.70	.88	4.04	.95	3.63	.73	4.07	.79	3.91	1.07	3.83	.75	3.90	.92

To compare the significance of the differences in the means of undergraduates' amount of computer use, One-Way ANOVA was performed as the data were distributed normally regarding their amount of daily computer use (hours). The results of the test are given in Table 10.

Table 10. One-Way ANOVA test results regarding amount of computer use

Variable	F	p	η2
Factor 1	.994	.430	1.278
Factor 2	1.361	.232	1.556
Factor 3	.424	.862	1.171
Factor 4	1.274	.270	2.728
Factor 5	1.773	.106	3.499
Total	1.258	.278	.931

The One-Way ANOVA results show that the undergraduates' levels of digital citizenship and its subdimensions do not differ significantly in terms of amount of computer use, p>.05.

The difference in digital citizenship levels and its subdimensions in terms of smartphone use

The undergraduates were asked how many hours they used a smartphone in a regular day. The means of undergraduates' amount of daily smartphone use is given in Table 11. Their answers were grouped as seen in the table.

Table 11. The undergraduates' means of the amount of daily computer use

Var.	0 h		0-1 h		1-2 h		2-3 h		3-4 h		4-5 h		5+ h	
	X̄	SD	X̄	SD	X̄	X̄	X̄	SD	SD	SD	X̄	SD	X̄	SD
F1	1.44	.63	2.00	1.16	2.55	1.40	2.00	1.13	2.08	1.12	2.12	1.16	2.25	1.06
F2	4.58	2.12	6.16	1.23	6.16	.88	6.31	1.15	6.27	.92	6.28	1.15	6.37	1.06
F3	3.33	3.21	4.50	2.17	5.19	1.74	4.87	1.46	4.77	1.56	4.70	1.55	4.67	1.73
F4	2.22	1.17	2.55	1.26	4.12	1.19	3.65	1.35	4.05	1.42	4.15	1.60	3.90	1.50
F5	1.55	.96	2.77	2.21	2.92	1.22	2.68	1.26	2.90	1.45	3.01	1.45	3.33	.42
Tot.	2.50	1.08	3.42	1.36	3.97	.78	3.78	.87	3.82	.89	3.89	.84	3.80	.86

To compare the significance of the differences in the means of undergraduates' amount of smartphone use, Kruskal-Wallis H test was performed as the data were not distributed normally regarding their amount of daily smartphone use (hours). The results are provided in Table 12.

Table 12. Kruskal-Wallis H test results regarding smartphone use

Variable	Chi-Square	df	p
Factor 1	5.079	6	.534
Factor 2	5.185		.520
Factor 3	2.818		.831
Factor 4	9.670		.139
Factor 5	9.278		.159
Total	8.436		.208

The test results reveal that the undergraduates' levels of digital citizenship and its subdimensions do not differ significantly in terms of amount of smartphone use, p>.05.

The difference in digital citizenship levels and its subdimensions in terms of their self-evaluation as to their skills levels of digital technology use

The undergraduates were asked to rate their skills of using digital technologies as weak, medium and high. To compare the means of undergraduates' digital citizenship in terms of skills of using digital

technologies, Kruskal-Wallis H test was performed as the data were not distributed normally regarding skill level. The results of the test are given in Table 13.

Table 13. Descriptive statistics and One-Way ANOVA test results regarding age

Var.	Weak		Medium		High				
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	df	Chi-Square	p
F1	2.00	1.15	2.03	1.05	2.55	1.25	2	8.633	.013
F2	4.87	2.25	6.24	1.06	6.58	.62		8.304	.016
F3	3.62	2.13	4.66	1.61	5.14	1.58		6.792	.034
F4	3.91	2.10	3.87	1.37	4.08	1.63		.575	.750
F5	3.12	1.76	2.98	1.34	3.13	1.58		.260	.878
Tot.	3.32	1.26	3.72	.77	4.08	.95		6.994	.030

The Kruskal-Wallis H test results put forth that for the total of the scale, the undergraduates' levels of digital citizenship differ significantly in terms of their self-evaluations as to their skills levels of digital technology use ($p<.05$), indicating that as the levels of undergraduates' skills of digital technology use (according to their self-evaluations) increase, their levels of digital citizenship increase. Regarding the subdimensions, the differences in the means of factors 1,2, and 3 are statistically significant ($p<.05$) while the differences in the means of factors 4 and 5 are not statistically significant ($p>.05$). To understand the significance level between the groups, pairwise comparisons were made between the factors through Mann-Whitney U test. The results are presented in Table 14.

Table 14. Pairwise comparison results through Mann-Whitney U test

Variable	Weak-Medium	Weak-High	Medium-High
	p	p	p
Factor 1	.861	.218	.004
Factor 2	.109	.017	.026
Factor 3	.131	.047	.043
Factor 4	.713	1.00	.482
Factor 5	.883	.976	.615
Total	.439	.099	.015

As seen in Table 14, there is not a significant difference between groups of weak and medium ($p>.05$); there is a significant difference between groups of weak and high in factors 2 and 3 ($p<.05$); there is a significant difference between groups of medium and high in the total of the scale as well as factors 1,2, and 3 ($p<.05$). These findings indicate that the undergraduates who regard their digital technology use skills as high have significantly higher means of digital citizenship regarding 'Technical Skills' and 'Local/Global Awareness' than the undergraduates who regard their skills as weak. In addition, the undergraduates who regard their digital technology use skills as high have significantly higher means of digital citizenship regarding overall digital citizenship, 'Internet Political Activism' and 'Technical Skills' than the undergraduates who regard their skills as medium.

DISCUSSION AND CONCLUSION

The current study reports the results of two studies. In Study I, 'Digital Citizenship Scale, developed by Choi, Glassman and Cristol (2017) was adapted to Turkish context, and its validity and reliability results are discussed. In Study II, undergraduates' levels of digital citizenship and examination of these levels with respect to age, faculty, gender, amount of daily computer use, amount of daily smartphone use, and self-evaluations as to their skill levels of digital technology use are reported based on the data obtained through the adapted scale. The results are summarized and discussed in this section.

In Study I, after the translation of the items in the scale in both languages and expert review, the language equivalency was ensured with a group of undergraduates who were proficient in both languages. The correlations between the Turkish and English implementations were satisfactory. The confirmatory factor analysis which was carried out to put forth construct validity resulted in acceptable results. The ratio of degree of freedom to chi-square value indicated a good fit ($\chi 2/df=2.01$). Goodness-of-Fit Index (GFI: .99), Adjusted Goodness-of-Fit Index (AGFI: .98), Normed Fit Index (NFI: .83), Root Mean Square Error of Approximation (RMSEA: .061) and Standardized Root Mean Square Residual (SRMR: .046), and Parsimony Normed Fit Index (PNFI: .68) were found within the acceptable thresholds. In the original scale (Choi, Glassman & Cristol, 2017), the ratio of degree of freedom to chi-square value was reported as 1.94, the values of GFI and RMSEA were .86 and .061 respectively. The results in the current study indicate a better value for GFI and the same value for RMSEA. Only Comparative Fit Index (CFI: .85) was found slightly below the threshold in the current study; however, the value is very close to .90 and it was calculated as .89 in the original scale. Therefore, it can be suggested that the data show a good fit with the model. On the other hand, the Cronbach's alphas are .86, .93, .83, .61, and .73 for the factors respectively and Cronbach's alpha for the entire scale is .87, which indicates a reliable instrument. In the original scale, these values were .83, .84, .89, .80, and .67 for the factors respectively and .88 for the entire items. The number of items in the scale reduced to 18, and the results reveal that the adapted form Digital Citizenship scale is a valid and reliable instrument.

In study II, it was found out that the participating undergraduates had medium level of digital citizenship in the entire scale (3.70 in 7-point Likert). In the study by Choi, Glassman and Cristol (2017), a similar result was obtained (3.80). In other studies, similar means were found (Choi, Cristol & Gimbert, 2018). On the other hand, Ke and Xu (2017) used another scale for measuring Chinese undergraduates' levels of digital citizenship and found that their means were below the medium level while in the studies by Xu, Yang, MacLeod and Zhu (2018) (with Chinese undergraduates), Alqahtani, Alqahtani and Alqurashi (2017) (with Middle Eastern and American undergraduates), Al-Zahrani (2015) (with Saudi undergraduates), Elçiçek, Erdemci and Karal (2018) (with Turkish graduate students), Sakallı (2015) (with Turkish pre-service teachers), Som Vural and Kurt (2018) (with Turkish undergraduates) and Çakmak and Aslan (2018) (with Turkish pre-service teachers) digital citizenship means were above the medium level. The factor of Internet Political Activism, which is lacking in other scales, may have affected the medium level mean obtained in the current study.

The factor with the least mean is Internet Political Activism. The original study also had the same result. As in that study, the action-oriented items were scored the least by the participants. The three items with the lowest means are about getting into action through digital technologies such as starting digital petitions, being a member of online political groups or participating to online meetings about local or political issues. This may be due to the fact that the individuals in Turkey mostly restrain from political activities and tasks demanding action from the respondents. Networking agency is also below the medium level. The factor of Critical Perspective is at medium level range and the factor of Local/Global Awareness is above medium level range. The mean of Technical Skills is very high as in Choi, Glassman and Cristol (2017). The items with the highest means in the current study are technical skills regarding digital technologies. The participating undergraduates perceive themselves as technically competent. This may stem from the fact that the tasks included in this factor are quite easy ones for the digital natives of the 21st century. It would be more sensitive if the scale included higher order technical skills yet the Choi, Glassman and Cristol (2017) regarded them as the basic open source intelligence skills. In line with the current study, in the study by Choi, Cristol and Gimbert (2018), the participating teachers had the lowest mean in Internet Political Activism and the lowest mean in Technical Skills.

In the examination of the differences of the participants' levels with respect to various variables, no significant difference could be found in terms of age, faculty, gender, amount of daily computer use and amount of daily smartphone use. With respect to gender, Çakmak and Aslan (2018), Sakallı (2015), and Isman and Canan Güngören (2013) reported that was not a significant difference with respect to gender, which is in parallel with the current study. Similarly, Choi, Cristol and Gimbert (2018) found that age and gender influenced only the two factors of digital citizenship (Internet Political Activism and Critical Perspective) but

not the others. However, Kocadağ (2012) reported a significant difference in the levels of digital citizenship in favour of male pre-service teachers while Som Vural and Kurt (2018) found a significant difference in the levels of digital citizenship in favour of female undergraduates.

Regarding the amounts of daily computer and smartphone use, there are some contrasting results in the literature. In line with the current study, Çiftci and Aladağ (2017) report that there is not a significant difference in pre-service teachers' digital citizenship levels with respect to daily internet usage amount, and Isman and Canan Güngören (2013) report no significant difference in terms of daily computer usage, however, Al-Zahrani (2015) found that daily average computer use predicted one factor (protecting oneself) of digital citizenship. Çakmak and Aslan (2018), Sakallı (2015) and Kocadağ (2012) found a significant difference in terms of amount of internet usage.

As in the current study, Çakmak and Aslan (2018) could not find a significant difference between pre-service teachers' digital citizenship levels in terms of age, which is the same for graduate students (Elçiçek, Erdemci and Karal, 2018) though a difference was identified by Kocadağ (2012). With respect to faculties, Elçiçek, Erdemci and Karal (2018) reported that there was not a significant difference in the digital citizenship levels of graduate students enrolled at education, natural sciences and social sciences institutes of universities. Similarly, Som Vural and Kurt (2018) found no difference in digital citizenship levels of undergraduates from various faculties. These results overlap with the current study.

In this study, the undergraduates' levels of digital citizenship differed significantly in terms of their self-evaluations as to their skills levels of digital technology use, indicating that as the levels of undergraduates' skills of digital technology use (according to their self-evaluations) increase, their levels of digital citizenship increase. In the group-wise comparison, there are significant differences indicating that the undergraduates who regard their digital technology use skills as high have significantly higher means of digital citizenship regarding 'Technical Skills' and 'Local/Global Awareness' than the undergraduates who regard their skills as weak. In addition, the undergraduates who regard their digital technology use skills as high have significantly higher means of digital citizenship regarding overall digital citizenship, 'Internet Political Activism' and 'Technical Skills' than the undergraduates who regard their skills as medium. The literature lends support to these results. In the study by Ke and Xu (2017), it was found out that students with higher computer qualifications had significantly higher means in the factor of 'educate yourself/ connect with others', which is a sub-factor of Ribble and Bailey's (2007) digital citizenship framework, and it was also reported that students with higher computer self-efficacy had higher means of digital citizenship. Similarly, social-media self-efficacy was found as a significant predictor of Chinese undergraduates' digital citizenship (Xu, Yang, MacLeod & Zhu, 2018). Al-Zahrani (2015) also report a relationship between computer self-efficacy and digital citizenship. In the Turkish context, Çiftci and Aladağ (2017) and Sakallı (2015) identified a significant difference in pre-service teachers' digital citizenship levels in terms of perceived internet-using skills.

To conclude, this study provides a valid and reliable Turkish form of Digital Citizenship Scale, which can be used with individuals from various backgrounds. The functionality of the adaptation may be tested in the further studies with participants from different age groups and education levels. The validity of the scale can also be tested in these studies. Study II found a medium level digital citizenship of undergraduates and no difference was identified in terms of variables except for perceived technology use skills. Given some of the contradicting results discussed above, more studies are needed identifying undergraduates' levels of digital citizenship from different backgrounds so that more solid results could be achieved and thereby more effective interventions could be designed in schools. Having more sound knowledge on students' digital citizenship levels and related factors also helps policy makers, authorities in the design and development of curricula as well as practitioners.

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