

# A scale development study to determine the digital citizenship levels of social studies teachers<sup>1</sup>

Onur YILMAZ<sup>2</sup>  Bilgin Ünal İBRET<sup>3\*</sup> 

<sup>2</sup>Institute of Social Sciences, Kastamonu University, Kastamonu, Türkiye.

<sup>3</sup>Department of Turkish and Social Sciences Education, Kastamonu University, Kastamonu, Türkiye.

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## Abstract

The aim of this study is to develop a valid and reliable scale to determine the levels of digital citizenship of social studies teachers. In the scale development phase, a scale item pool of 79 items was created. The created scale item pool was submitted to expert opinion; 44 items were removed in the first stage, and 14 items were removed in the second stage. The draught scale was applied to 321 social studies teachers who work in secondary schools affiliated with the Ministry of National Education in the Eskisehir province in the academic year 2021-2022. As a result of exploratory and confirmatory factor analyses, a unique, valid and reliable digital citizenship scale for social studies teachers with 4 factors and 21 items was developed with a total variance explained of 54.959%. The Cronbach Alpha coefficient for the whole scale was calculated as 0.91. The data obtained proved that the scale is a valid and reliable scale.

## 1 Introduction

With the development of technology that can affect the lives of individuals in many ways, numerous tools and applications that can be used in daily life have emerged. Thanks to these tools and applications, individuals have become able to talk and communicate with each other without time or distance barriers, and they have carried out many daily activities, such as sending e-mails, listening to music, reading newspapers, playing games, and watching films without knowing the place (Karaduman, 2011). In addition, with the opportunities provided by the Internet and technology, individuals have developed an effective and easy way to freely express their ideas and thoughts on a subject and convey them to the larger masses. Considering all of these, it can be said that the Internet and technology are an important part of an individual's social life.

The creation of new environments in which people feel connected through social networks on the Internet has also shaped and changed the habitual environment in the historical process within the framework of social norms. Individuals have begun to abandon the cultural elements they are

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used to within the cultural structure formed by the society in which they were born, and enter a new acculturation process with the influence of popular culture spreading with technology. This process has brought about complications in situations such as clothing, dress, working hours, friendship relations, and family culture. In fact, this process has also changed individuals' perception of citizenship and their behavioral patterns in the society in which they are citizens. Since the formation of the modern state, the understanding of nationalization and national citizenship, which has come to the fore in many countries formed with the nation-state understanding, has been transferred to the understanding of being a citizen of the world through the effect of globalization, and a transformation has been experienced in the citizenship perception of individuals from local to global.

In the 21st century, as digital technologies have an undeniable impact on the lives of individuals, it has been emphasized that many technology-oriented literacy and behavioral forms should be present in individuals within global citizenship. According to the Organisation for Economic Co-operation and Development [OECD]; 2022), digital citizenship competencies should be acquired in the context of sustainable development, education, and global education. In this context, it can be said that the understanding of citizenship that an individual must adapt to in a changing world order is digital citizenship.

A digital citizen can be defined as a person who participates in social life, is open to communicating with others, and has the skills and knowledge to use digital technology effectively to create, distribute, and consume digital content (Ribble, 2009, 2011; Soriani, 2018). In this context, digital citizenship can be defined as the ability to use technology and the digital tools and environments brought about by technology correctly with a sense of security and responsibility, respecting and managing ethical rules and personal rights in digital environments (Çubukcu & Bayzan, 2013; Ocak, 2013; Ribble, 2009; 2011).

Digital citizenship includes nine dimensions: digital ethics, digital communication, digital literacy, digital access, digital commerce, digital rights and responsibilities, digital privacy and security, digital law, and digital health, and aims to contribute to the development of individuals as digital citizens by developing their cognitive, affective, and psychomotor skills within the framework of these dimensions (Ribble, 2009; 2011; 2015). In this respect, it is important to give importance to the digital citizenship education process of the individual in terms of raising a citizen with determined qualifications, and to clearly determine the duties of education in gaining the knowledge, skills, and values required by being a digital citizen (OECD, 2018). In fact, technology can be used effectively, safely, and consciously through digital citizenship education, which is supported in every part of life.

Digital citizenship education can be defined as providing the individual with the knowledge, skills, and values needed through education to develop the individual in the field of technology and provide active learning in the developing world (Ribble, 2015). In other words, it represents a new dimension of citizenship education that focuses on teaching students to work, live, and share actively and positively in digital environments (Richardson & Milovidov 2019). Therefore, the active, useful, and conscious use of technology, which is increasingly important in an individual's life, is considered the responsibility of digital citizenship education (Moradi Sheykhjan, 2017).

In line with the necessity of providing digital citizenship education to individuals, educational reforms have begun to be carried out to raise individuals as individuals who have developed communication skills, can solve problems, are constructive, creative, successful in the use of

technology, and can cooperate and share when necessary (Vural & Kurt, 2008). In line with these reforms, digital citizenship skills have been added to education programs in many countries. Additionally, in the context of digital competencies, curricula were created for each course to gain digital competencies. One of these courses was on social studies.

The social studies course undertakes the task of providing citizenship skills to individuals at the secondary school level of primary education and raising the individual as an active citizen. When the social studies curriculum is examined, it is seen that it includes elements related to digital citizenship in general and specific objectives, learning areas, achievements, skills, and values (Ministry of National Education [MoNE], 2018). Digital Competence, which is reflected in the social studies curriculum within the scope of the Turkish Qualifications Framework, reveals the importance of digital citizenship education in the social studies course, as follows:

Digital competence encompasses the safe and critical use of information and communication technologies for work, daily life, and communication. This competence is supported by basic skills, such as accessing information and using computers to evaluate, store, produce, present, and exchange information, as well as participating in public networks and communicating over the Internet (MoNE, 2018).

In this context, it can be said that the social studies course is important for digital citizenship and is a pioneer in providing digital competences to the individual in the context of the past, present, and future.

The course curriculum and textbooks created in accordance with this curriculum serve as guides for that course. However, teachers are an important factor in the acquisition of knowledge, skills, and values presented to the individual through the curriculum and textbooks. In this respect, it is important that the knowledge, skills, and values that are thought to be gained by the individual within the framework of digital citizenship education are first known, transformed into skills, and then applied by the teacher. In fact, the teacher will have problems transferring knowledge, skills, or values that they do not have to students. In this context, it is important to know the levels of digital citizenship of social studies teachers in terms of subsequent practices and reforms.

When the literature was examined, it was seen that studies were generally conducted to determine the levels of digital citizenship of prospective teachers in the context of the course of social studies course; these studies focused on evaluating the levels of digital citizenship of prospective teachers in terms of various variables (Aslan & Çakmak, 2018; Çolak & Öztürk, 2022; Görmez, 2020; Karaduman, 2017; Sakal, 2015; Yalmaz & Doğusoy, 2020) and examining their perceptions of digital citizenship perceptions (Karasu Avcı et al., 2021; Aygün, 2019; Dere & Yavuzay, 2019). Aslan and Çakmak (2018) examined the perceptions of digital citizenship of pre-service social studies teachers in terms of variables such as gender, age, average monthly income of the family, own computer, social network membership, grade of social studies students, and duration of their stay on the Internet. Çolak (2022) examined the digital citizenship levels of pre-service social studies teachers in terms of variables such as gender, university, grade level, internet usage frequency, and monthly income. Görmez (2017) aimed to reveal the levels of digital citizenship among teachers in different branches in his research conducted using a qualitative research method. Karaduman (2017) aimed to determine and compare the perceptions of pre-service social studies teachers living in Turkey and the United States regarding digital citizenship issues. Kuş et al. (2017) developed a valid and reliable scale to determine the levels of digital citizenship of young people. Som-Vural (2016) aimed to determine digital citizenship indicators from the perspective

of university students. Dere and Yavuzay (2019) examined digital citizenship indicators of preservice social studies teachers. In addition, Metin and Cin (2021) developed a digital citizenship competency scale for prospective social studies teachers.

In addition to the fact that these scales, developed specifically for social studies, make important contributions to the social studies literature, there are differences between preservice and experienced teachers. Experienced teachers have a wide range of practice history in terms of building relationships with students, pedagogical knowledge, skills, and professional development. The professional development of social studies teachers is an important factor that affects student achievement. The continuous learning of new skills, strategies, and pedagogical approaches supports teachers' professional development. This helps them provide better learning experiences in the classroom and respond better to students' needs. It is predicted that measuring teachers' digital citizenship competencies will contribute to the studies and developments conducted in this field, teachers' training needs can be determined, and training programs can be updated accordingly. In addition, determining the digital citizenship competencies of teachers can help provide digital citizenship education in schools, contribute to students' healthy and responsible behaviors in the digital world, and support the digital world to be a safe and ethical environment.

A study of social studies teachers aimed to understand their views on digital citizenship (Kilci, 2020). Apart from these studies, while there are many studies on preservice teachers, it has been observed that studies on teachers are limited, and no study has aimed to determine the digital citizenship levels of teachers on the basis of social studies. This study aimed to develop a scale to determine the level of digital citizenship among social studies teachers. It is expected that the developed 'Social Studies Teachers' Digital Citizenship Scale (SSTDCS)' will determine the digital citizenship levels of social studies teachers, contribute to future research, and guide different studies to be structured on the current situation.

### **1.1 Purpose of the research**

This research aims to develop a scale to determine the level of digital citizenship in social studies teachers. Within the scope of the research, the question 'At what level are the digital citizenship competencies of social studies teachers?' were used to answer this question.

## **2 Method**

This section covers the development studies of the 'Social Studies Teachers' Digital Citizenship Scale (SSTDCS)' prepared to measure the digital citizenship levels of social studies teachers.

### **2.1 Research group**

The study population comprised of 321 social studies teachers working in secondary schools affiliated with the Ministry of National Education in Eskişehir. Within the scope of the validity and reliability studies of the scale, whose draft was prepared during the scale development process, it was learned that there were 379 social studies teachers in the Eskişehir Provincial Directorate of National Education. The aim was to reach a research group within the scope of social studies teachers. However, some teachers did not voluntarily participate in this study. Furthermore, data from teachers who did not complete the scale properly were excluded. The number of teachers who voluntarily participated in the study was 321, 163 (50.8%) of whom were female and 158 (49.2%) were male. Table 1 presents descriptive statistics of the participants.

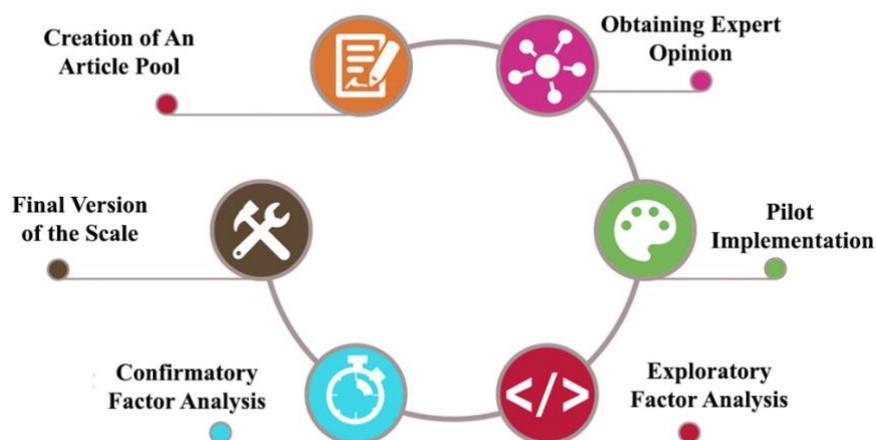
**Table 1** Descriptive analysis results of teachers' digital citizenship levels

Demographic data		<i>f</i>	%
Gender	Female	163	50,8
	Male	158	49,2
	Total	321	100,0
Professional seniority	0 – 5 years	162	50,5
	6 – 10 years	69	21,5
	11 -15 years	35	10,9
	16 – 20 years	36	11,2
	20 years and older	19	5,9
Total	321	100,0	
Frequency of daily Internet use	Less than 2 hours a day	25	7,8
	2-4 hours a day	66	20,6
	4-6 hours a day	143	44,5
	More than 6 hours a day	87	27,1
Total	321	100,0	
E-Government Gateway password	Yes	316	98,4
	No	5	1,6
	Total	321	100,0

As shown in Table 1, 321 teachers (163 females and 158 males) participated in the study. Of the social studies teachers participating in the study, 162 had 0-5 years of professional seniority, 69 had 6-10 years of professional seniority, 35 had 11-15 years of professional seniority, 36 had 16-20 years of professional seniority, and 19 had  $\geq 20$  years of professional seniority. 25 teachers use the Internet for less than two hours a day, 66 teachers used it between 2-4 hours a day, 143 teachers used it between 4-6 hours a day, and 87 teachers used it more than six hours a day. A total of 136 teachers had a password to the e-government portal, while 5 teachers did not.

## 2.2 Scale development process

In the process of developing the Social Studies Teachers' Digital Citizenship Scale (SSTDCS), The stages shown in Figure 1 were followed in the process of developing the SSTDCS.



**Figure 1** Stages of development of the Social Studies Teachers' Digital Citizenship Scale (SSTDCS) (Yılmaz, 2022).

As shown in Figure 1, in the scale development process, the following stages were followed: creating the item pool, obtaining expert opinions, conducting a pilot study, conducting an

exploratory factor analysis (EFA), conducting a confirmatory factor analysis (CFA), and finalizing the scale.

### **2.2.1 Creation of an article pool**

Before the first stage of the scale development process, which involved the creation of an item pool, a literature review was conducted. In this context, the domestic and foreign literature was reviewed, and firstly, the 'General Competencies for Teaching Profession' and 'Special Field Competencies' determined by the Ministry of National Education were examined to determine which digital citizenship skills teachers should have within the framework of social studies education. In addition, theoretical information on the concept of digital citizenship and its sub-factors was collected from different studies in the literature. Additionally, scales covering digital citizenship and its factors have been examined (Glasman et al., 2007; İşman & Güngören, 2014; Jones & Mitchell, 2016; Karaduman, 2011; Kocadağ, 2012; Kuş et al., 2017; Ribble, 2004; Şom Vural, 2016). An item pool was created an item pool to cover the concept of digital citizenship proposed by Ribble (2005) and its nine dimensions of digital citizenship. As it would be preferable to have more than three or four times the number of items in the developed scale in the item pool to be created (Tezbaşaran, 1996), a scale item pool consisting of 79 items was created.

### **2.2.2 Obtaining expert opinion**

After the creation of the item pool, the draft version of the developed scale was submitted to an expert opinion for evaluation within the scope of language, expression and spelling, social studies field, digital citizenship issues, and subfactors. The item pool was analyzed by two grammar experts in terms of language, expression, and spelling before it was submitted to field experts. Then, all items were combined in a single form and sent to six social studies educators with different titles and four academics who had studied in the field of digital citizenship for expert opinion. In the scale item evaluation form sent to experts, a 3-point rating scale (1: Appropriate, 2: Improvable, 3: Not Appropriate) was used. The experts preferred the rating for the scale item, and the items were revised by explaining to the experts who provided explanations as a criterion. The item elimination process was conducted by considering the content validity ratio ( $\alpha=0.05$ , reliability coefficient for each item) determined by Lawshe (1975). After obtaining expert opinions, the scale pool consisting of 79 items was reduced to 35. The revised scale was then finalized. Reverse scale items were prepared in the finalized scale item pool, and the scale was designed in accordance with a 5-point Likert scale (Strongly Agree-Agree-Disagree-Neutral-Disagree-Strongly Disagree).

### **2.2.3 Pilot implementation**

A personal information form was added to the scale form for the participant group according to their age, seniority, gender, internet use, etc. A pilot study was conducted before its final implementation. The pilot application was conducted using an online data collection tool created in 'Google Forms' in the digital environment. Social studies teachers working in public secondary schools affiliated with the Ministry of National Education tried to be reached through social media (Facebook, Telegram, WhatsApp, etc.), and the online scale was sent to them if they volunteered. During the pilot application phase, no negative feedback was received from participants regarding the scale. The final application was initiated after pilot application.

## **2.5 Data collection**

In the final implementation process, 379 social studies teachers worked in secondary schools affiliated with the Eskişehir Provincial Directorate of the National Education. Teachers who did not voluntarily participate in this research were excluded. Additionally, missing data such as invalid coded, blank, or multiple-coded scales were excluded from the analysis. Outliers were identified and excluded from the analysis based on box plots and histograms in SPSS. As a result, 321 social studies teachers worked in public secondary schools in the Ministry of National Education. To collect the research data, the scale form was transferred to the 'Google Form' and the data were collected through teacher WhatsApp groups.

## 2.6 Data analysis

Data were analyzed using the SPSS 24 package program. The items were subjected to exploratory factor analysis (EFA) to determine the factorization status and item factor loadings. Within the scope of the Exploratory Factor Analysis, we checked whether normality was ensured for validity, and Bartlett's sphericity test and KMO values were examined. In addition to these analyses, a Catell ScreePlot graph was used to determine the factor structure. AMOS licensed analysis software was used for the Confirmatory Factor Analysis (CFA) of the scale. Similarly, the normal distribution was checked in the confirmatory factor analysis, and the kurtosis and z-values were determined. Then, the chi-square and degrees of freedom were calculated, and the reliability of the scale structure was tested using reliability coefficients, such as RMCA, NFI, and CFI. The scale was analyzed using the CA and split-half (test halving) methods, and the values were obtained.

## 3 Findings

In this section, the validity and reliability studies of the Social Studies Teachers' Digital Citizenship Scale (SSTDCS) are explained.

### 3.1 Findings related to the validity of the Social Studies Teachers' Digital Citizenship Scale (SSTDCS)

#### 3.1.1 Exploratory factor analysis

To explain the validity of the construct, to determine the factor loadings of the items, and to factor the scale, a factor analysis was performed. In this context, the Kaiser-Meyer-Olkin (KMO) Sampling Adequacy Measure was used to determine the adequacy of the sample size (Akbulut, 2010). In the literature, it is explained that the KMO Sampling Adequacy Measure can take values between 0 and 1, and values above 0.6 are generally considered acceptable (George & Mallery, 2001; Kline, 2014; Pallant, 2007; Tabachnick & Fidell, 1996), while values higher than 0.9 are perfect for this process. After obtaining the KMO value, Bartlett's sphericity test results were analyzed. The statistical data related to KMO and Bartlett's test of sphericity of the SBSAS are shown in Table 1.

**Table 1** KMO and Bartlett's test of sphericity results of the SSTDCS

Kaiser-Meyer-Olkin Sampling Adequacy Measure	0,898
X <sup>2</sup>	2240,392
Bartlett's test of sphericity standard value	210
p	<0,001

As seen in Table 1, the KMO value of the Social Studies Teachers' Digital Citizenship Scale (SSTDCS) was found to be 0.898. The KMO value indicates that the scale structure can be factored up to the lower limit of  $p < 0.50$ , and factorization can be performed for values greater than this

value. The 0,898 KMO value shows that the model is well modelled in the factoring process (Field, 2000). The Bartlett's sphericity test results (2240,392,  $p < 0,001$ ) were significant (George & Mallery, 2001). In this context, it can be said that the scale is sufficient for exploratory factor analysis and that the result of Bartlett's sphericity test is appropriate for exploratory factor analysis ( $p < 0,001$ ).

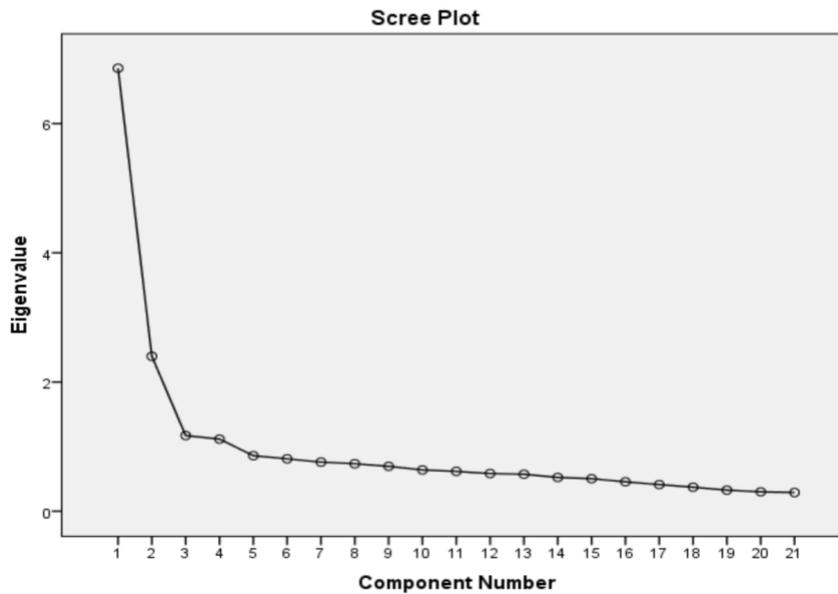
After determining the suitability of the sample for exploratory factor analysis, the factor determination stage was started. Exploratory factor analysis included seven factor extraction methods: principal component analysis (PCA), principal axis factor analysis (FA), maximum likelihood analysis (ML), image factor analysis (IF), unweighted least squares analysis (ULS), generalized least squares analysis (GEK), and alpha analysis (AF). The most frequently used factor extraction method is principal component analysis (Büyüköztürk, 2002; Şencan, 2005). In this study, the principal component analysis method, which is the preferred method in the literature, was used. Kaiser's criterion was used to determine the number of factors, and factors with lower limit eigenvalues of 1 and above were accepted. In addition, it is explained in the literature that the criterion of 'percentage of total variance' is also considered when determining the number of factors and the maximum number of factors will be reached when the contribution of each added factor to the explanation of the total variance falls below 5% (Yaşloğlu, 2017). A calculation was also performed to reveal the number of factors found and the percentage of total variance explained by each factor, separately. The values related to the total variance are shown in Table 2.

**Table 2** Values related to total variance

Article	Eigenvalue	Variance Explained	Total variation	Rotation sums of squared loads		
				Total	Total variation (%)	Cumulative Explained Variance
1	6,856	32,649	32,649	5,084	24,208	24,208
2	2,397	11,416	44,065	2,494	11,875	36,083
3	1,172	5,579	49,644	2,419	11,517	47,600
4	1,116	5,315	54,959	1,545	7,359	54,959
5	0,860	4,097	59,056			
6	0,811	3,864	62,919			

As seen in Table 2, the scale consists of four subfactors according to the EFA results. The subfactors explained approximately 55% of the total variance in the scale. The eigenvalues of the four factors on the scale are 6,856, 2,397, 1,172, and 1,116, respectively. All of these values were greater than 1. However, the variance percentages explained by these factors are 32,649, 11,416, 5,579, and 5,315, respectively. All four factors were above Kline's (1994) acceptability level, and explained 54.959% of the total variance. This indicates that the scale was a four-factor scale.

Another criterion considered in determining these factors is Catell's Scree Plot Test (slope-accumulation graph). The scree plot of the Social Studies Teachers' Digital Citizenship Scale (SSTDACS) is shown in Figure 2.



**Figure 2** Scree-slope-accumulation graph of the Social Studies Teachers' Digital Citizenship Scale (SSTDACS) As shown in Figure 2, Catell's Scree Plot Test also showed that the factor structure for the scale emerged as four factors.

Exploratory Factor Analysis and Varimax Rotation techniques were used to assess the scale's construct validity. After the Exploratory Factor Analysis and Varimax Rotation techniques, the distribution of the items in the Social Studies Teachers' Digital Citizenship Scale (SSTDACS) draft is given in Table 3.

**Table 3** Factor load distribution of the EFA results of the Social Studies Teachers' Digital Citizenship Scale (SDSCDS)

Sub- Factors	Education and Communication	Respect	Protect	Rights and Responsibilities
S30	0,756			
S29	0,736			
S27	0,712			
S34	0,663			
S25	0,637			
S31	0,633			
S19	0,617			
S32	0,602			
S23	0,561			
S20	0,502			
S10	0,478			
S13	0,425			
S1		0,802		
S2		0,758		
S3		0,676		
S26			0,781	
S14			0,775	
S9			0,681	
S16			0,596	
S18				0,784

S11

0,749

As seen in Table 3, after the exploratory factor analysis, the draught of the Social Studies Teachers' Digital Citizenship Scale (SSTDACS) was reduced from 35 items to 21 items. Fourteen of the 35 items were removed from the scale because their factor loadings were below 0.40, and they were considered to be related to other factors. There are four factors in the scale: the first factor with 12 items is 'Education and Communication,' the second factor with 3 items is 'Respect,' the third factor with 4 items is 'Protect,' and the last factor with 2 items is 'Rights and Responsibilities.' The factors and items under these factors are listed in Table 4.

**Table 4** Items found under the factors as a result of EFA of the Social Studies Teachers' Digital Citizenship Scale (SDSCDS)

Factors	Articles
<b>Education and Communication</b>	Q10: I pay attention to the bibliography in the materials I prepare for my students.
	Q13: When necessary, I can exercise my right to request, report, and complain through digital media (e-government, BIMER...)
	Q19: I pay attention to the fact that the sites that I shop in the digital environment are corporate and reliable.
	Q20: I actively use the 3D security system in my shopping in digital environments.
	Q23: I can use the necessary programmes to prepare presentations (such as Prezi, Powerpoint)
	Q25: I know the ways of protection from crime and criminal elements in digital environments.
	Q27: I pay attention to act within the framework of laws in the digital environment.
	Q29: I can take precautions against digital attacks (Firewall, antivirus programmes, etc.)
	Q30: I can easily perform banking transactions, such as transfers and EFTs, without going to a branch.
	Q31: I can use the MEBBIS information system without any help.
<b>Respect</b>	Q1: I can easily access the digital media I want.
	Q2: I solve technical problems I encounter in digital environment.
	Q3: I benefit from the facilities provided by the digital environment (education, health, social environment, etc.).
<b>Protect</b>	Q9: When using digital tools, it is important that my personal information (e-mail password, T.R. ID number, membership passwords...)
	Q14: When necessary in the digital environment, I access banned sites using different methods.
	Q16: There is no harm in copying and using the content to be used for educational purposes.
	Q26: The free downloading of copyrighted products on digital media is not an offence.
<b>Rights and Responsibilities</b>	Q11: I do not watch content containing elements of violence on digital media.
	Q18: I do not download pirated publications in digital media.

As seen in Table 4, the first factor of the scale, 'Education and Communication,' consists of 12 items (S10; S13; S19; S20; S23; S25; S27; S29; S30; S31; S32; S34); the 'Respect' factor consists of three items (S1; S2; S3); the 'Protect' factor consists of four items (S9; S14; S16; S26), and the 'Rights and Responsibilities' factor consists of two items (S11; S18).

### 3.1.2 Confirmatory factor analysis

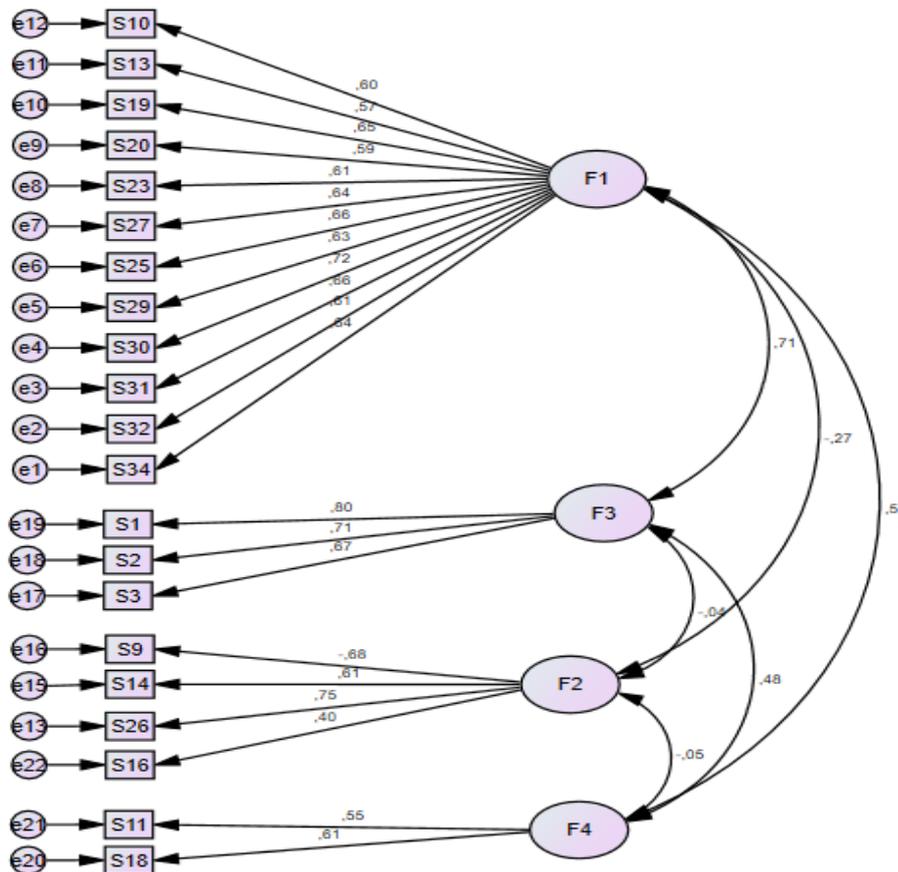
Confirmatory factor analysis (CFA) was performed to confirm the factor structures of the scale, which consisted of a four-factor structure as a result of exploratory factor analysis. In the CFA, we first tested whether the scale was suitable for a multivariate normal distribution. The results of the multivariate normal distribution of the Social Studies Teachers' Digital Citizenship Scale (SSTDCS) are shown in Table 5.

**Table 5** Multivariate results of the normal distribution of the Social Studies Teachers' Digital Citizenship Scale (SDSCDS)

AMOS	Kurtosis	Z value
	80,671	23,252

*The difference was significant at the P<.001 level.*

As seen in Table 5, as a result of the multivariate normal distribution test, the p-value was 0.001 and the z-value was 23.252. Based on the obtained values, we concluded that the data did not follow a multivariate normal distribution. In this case, the results were analyzed using the maximum-likelihood method. A primary-level confirmatory factor analysis (CFA) was applied to the scale developed to determine the level of digital citizenship of teachers. The results of the analysis and path diagram for primary-level CFA are shown in Figure 3.



Chi-Square: 490,650 df:183 p:0,001 RMSEA: 0,07

F1: Education and Communication; F2: Respect; F3: Protect; F4: Rights and Responsibilities

**Figure 3** Path diagram for CFA of the Social Studies Teachers' Digital Citizenship Scale (SSTDCS)

Figure 3 shows the four-factor path diagram of the Social Studies Teachers' Digital Citizenship Scale (SSTDCS). The fit index values obtained from the path diagrams are listed in Table 6.

**Table 6** Fit index values of the Social Studies Teachers' Digital Citizenship Scale (SSTDCS)

Index	Good Fit	Acceptable Compliance	Results
NFI	$0.95 \leq \text{NFI} \leq 1.00$	$0.90 \leq \text{NFI} \leq 0.95$	0,80
CFI	$0.97 \leq \text{CFI} \leq 1.00$	$0.95 \leq \text{CFI} \leq 0.97$	0,87
GFI	$0.90 \leq \text{GFI} \leq 0.95$	$0.95 \leq \text{GFI} \leq 1.00$	0,84
AGFI	$0.90 \leq \text{AGFI} \leq 1.00$	$0.85 \leq \text{AGFI} \leq 0.90$	0,87
SRMR	$0.00 \leq \text{SRMR} \leq 0.05$	$0.05 \leq \text{SRMR} \leq 0.10$	0,09
RMSEA	$0.00 \leq \text{RMSEA} \leq 0.05$	$0.05 \leq \text{RMSEA} \leq 0.10$	0,07
$\chi^2 / \text{sd}$	$0 \leq \chi^2 / \text{sd} \leq 2$	$2 \leq \chi^2 / \text{sd} \leq 3$	2,68

When the fit index values obtained as a result of the CFA analysis given in Table 6 are analysed, it is seen that the model of the Social Studies Teachers' Digital Citizenship Scale (SSTDCS) consisting of 4 factors is acceptable. When the factor loadings of the items representing each factor are analyzed, they range between 0.57-0.72 for the education and communication factor, 0.67-0.80 for the respect factor, 0.40-0.75 for the protect factor and 0.55-0.61 for the rights and responsibilities factor.

The model fit values calculated in the CFA were as follows: Normed Fit Index (NFI) value 0.80, comparative fit index (CFI) value 0.87, Goodness-of-fit Index (GFI) value 0.84, standardized root mean square residual (SRMR) value 0.09, Root Mean Square Error of Approximation (RMSEA) value 0.07, and chi-square/degree of freedom value 2.68. When analyzed in terms of these values, it was concluded that the model showed a good fit.

### 3.2 Reliability analyses of the Social Studies Teachers' Digital Citizenship Scale (SSTDCS)

Exploratory and confirmatory factor analyses conducted within the scope of validity of the Social Studies Teachers' Digital Citizenship Scale (SSTDCS) revealed that it is a valid scale. To test the reliability of the Social Studies Teachers' Digital Citizenship Scale (SSTDCS), the scale was analyzed using Cronbach's alpha (CA) and split-half (test halving) methods; the values obtained are shown in Table 7.

**Table 7** Analysis of the Social Studies Teachers' Digital Citizenship Scale (SDSCDS) in terms of CA and split-half methods

Factors	Number of items	CA	Splitting the test in half (Split-Half) method
Education and Communication	12	0,89	0,85
Respect	3	0,76	0,68
Protect	4	0,35	0,33
Rights and Responsibilities	2	0,50	0,50
The whole scale	21	0,91	0,87

When Table 7 is analyzed, the reliability values are given for each factor and for the entire scale. If the scale has sub-dimensions, each dimension can be applied as a whole (Karakoç & Dönmez, 2014). As the reliability values is 0,91, it can be said that the scale is perfectly reliable.

When the number of items is large, combined reliability (CR) can be used as an alternative to CA. The CR value, like the CA value, must be greater than 0.70 (Kline, 2014; Pierce, 1995). The AVE value, known as the average variance, is obtained by dividing the sum of the covariance squares of the statements related to the factor by the sum of the covariance squares. AVE values are

expected to be greater than 0.50 (Hair, 1998). Table 8 presents the CR and AVE values for these factors.

**Table 8** CR and AVE values for the factors of the Social Studies Teachers' Digital Citizenship Scale (SSTDACS)

Sub Factors	CR	AVE
Education and Communication	0,88	0,52
Respect	0,79	0,56
Protect	0,80	0,51
Rights and Responsibilities	0,74	0,60

As seen in Table 8, the 'Education and Communication' factor was explained as CR=0.88/ AVE=0.52; the 'Respect' factor as CR=0.79/ AVE=0.56; the 'Protect' factor as CR=0.80/ AVE=0.51 and the 'Rights and Responsibilities' factor as CR=0.74/ AVE=0.60. Accordingly, the CR values were above 0.70, and the AVE values were above 0.50. In this context, it can be said that the Social Studies Teachers' Digital Citizenship Scale (SSTDACS) provides general reliability.

## 4 Conclusions

This study, a 4-factor scale consisting of 21 items, to determine the level of digital citizenship of social studies teachers. In the scale-development phase, a pool of 79 items was created. In the first stage, 44 items were removed from the item pool submitted to the expert opinion, and 14 items were removed in the second stage.

In the study, it was determined that the Social Studies Teachers' Digital Citizenship Scale (SSTDACS) explained 4 factors and the total variance explained was 54,959%. The factors were named as 'Education and Communication,' as 'Respect,' as 'Protect,' Rights, and Responsibilities. The distribution of items in these factors was determined as 'Education and Communication' factor 12 items (Q10; Q13; Q19; Q20; Q23; Q25; Q27; Q29; Q30; Q31; Q32; Q34); 'Respect' factor 3 items (Q1; Q2; Q3); 'Protect' factor 4 items (Q9; Q14; Q16; Q26) and 'Rights and Responsibilities' factor 2 items (Q11; Q18).

Another result of the research is that the Cronbach's  $\alpha$  coefficient for the whole scale is 0.91, indicating excellent reliability. The fact that this value is above 0.70 also shows that the scale is consistent within itself.

In the analyses conducted for the general reliability of the scale, it was concluded that the CR values were above 0.70 and the AVE values were above 0.50. Accordingly, the 'Education and Communication' factor was explained as CR=0.88/ AVE=0.52; 'Respect' factor as CR=0.79/ AVE=0.56; 'Protect' factor as CR=0.80/ AVE=0.51 and 'Rights and Responsibilities' factor as CR=0.74/ AVE=0.60. Based on these reference values, it can be said that the scale provides general reliability.

When the factor loadings results of the scale were analyzed, it was found that the factor loadings were in the range of 0.57-0.72 for the 'Education and Communication' factor, 0.67-0.80 for the 'Respect' factor, 0.40-0.75 for the 'Protect' factor, and 0.55-0.61 for the 'Rights and Responsibilities' factor and the model of the scale was acceptable.

In line with these results, it can be said that the Social Studies Teachers' Digital Citizenship Scale (SSTDACS) is a valid and reliable scale that is sufficient to measure the digital citizen levels of social studies teachers.

### 4.1 Limitations and future directions

The research was carried out with 321 social studies teachers studying in the center of a single province. Future comparative studies should be conducted to increase the sample size.

## 5 Statement of researchers

### 5.1 Researchers' contribution rate statement

This research is derived from a part of the first author's PhD thesis conducted under the supervision of the second author.

### 5.2 Conflict statement

The authors declare no conflicts of interest. The publication rights of this article have been transferred to the Pedagogical Perspective Journal.

### 5.3 Support and thanks

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## Sosyal Bilgiler Öğretmenlerine Yönelik Dijital Vatandaşlık Ölçeği

SIRA	MADDELER	Keskinlik Katılıyorum	Katılmıyorum	Kararsızım	Katılmıyorum	Keskinlik Katılmıyorum
1	İstediğim dijital ortamlara kolaylıkla erişim sağlıyorum.	1	2	3	4	5
2	Dijital ortamda karşılaştığım teknik sorunları çözerim.	1	2	3	4	5
3	Dijital ortamın sağladığı kolaylıklardan (eğitim, sağlık, sosyal çevre vb.) yararlanırım.	1	2	3	4	5
4	Sunu hazırlamak için gerekli programları kullanabilirim (Prezi, Powerpointgibi)	1	2	3	4	5
5	Dijital aletleri kullanırken sağlık açısından gerekli düzenlemeleri yaparım.	1	2	3	4	5
6	Dijital ortamlarda yaptığım alışverişlerde 3D güvenlik sistemini aktif olarak kullanırım.	1	2	3	4	5
7	Öğrencilerime hazırladığım materyallerde kaynakça gösterimine özen gösteririm.	1	2	3	4	5
8	Gerekli durumlarda dijital ortamlar aracılığıyla talep, ihbar ve şikayet hakkımı (e-devlet, BİMER...)	1	2	3	4	5
9	Dijital ortamlarda telif hakkı isteyen ürünlerin ücretsiz indirilmesi suç değildir.	1	2	3	4	5
10	Dijital ortamda alışveriş yaptığım sitelerin kurumsal ve güvenilir olmasına dikkat ederim.	1	2	3	4	5
11	MEBBİS bilgi sistemini yardım almadan kullanabilirim.	1	2	3	4	5
12	Dijital ortamlarda suç ve suç unsurlarından korunma yollarını bilirim.	1	2	3	4	5
13	Çevrimiçi ortamlarda beni olumsuz etkileyecek içeriklerden kendimi koruyabilirim.	1	2	3	4	5
14	Dijital ortamda kanunlar çerçevesinde hareket etmeye dikkat ederim.	1	2	3	4	5
15	Havale, EFT gibi bankacılık işlemlerini şubeye gitmeden kolayca yapabilirim.	1	2	3	4	5
16	Dijital saldırılara karşı önlem alabilirim (Güvenlik duvarı, antivirüs programları gibi)	1	2	3	4	5
17	Dijital ortamda gerektiğinde yasaklı sitelere farklı yöntemler kullanarak girerim.	1	2	3	4	5
18	Dijital araçları kullanırken kişisel bilgilerimin (e-posta şifrem, T.C. kimlik numarama, üyelik şifrelerim...)	1	2	3	4	5
19	Eğitim amaçlı kullanılacak içeriklerin kopyalanması ve kullanılmasında bir sakınca yoktur.	1	2	3	4	5
20	Dijital ortamda bulunan korsan yayınları indirmem.	1	2	3	4	5
21	Dijital ortamlarda şiddet unsurları içeren içerikleri izlemem.	1	2	3	4	5