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EVALUATION OF DIGITAL LITERACY STATUS OF UNIVERSITY STUDENTS

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ABSTRACT

Objective: The present study aimed to evaluate digital literacy among undergraduate students.

Materials and Methods: The research sample consisted of 320 undergraduate students enrolled at the departments of nursing and emergency aid and disaster management in the 2020-2021 academic year. We collected the data using the Digital Literacy Scale, the Online Social Support Scale, and the Academic Self-Efficacy Scale. In the data analysis, we considered percentiles and means and performed one-way analysis of variance, pearson correlation and post hoc tests (Tukey HSD and Games Howell multiple comparison test). All statistical analyses were performed on SPSS 25.0, and $p<0.05$ was considered significant.

Results: The results revealed the mean digital literacy score of the participants to be 57.21±16.47. Besides, we found that the participants' scores on the Digital Literacy Scale and its subscales significantly differed by their year of study, parental educational attainment, the number of electronic devices owned, and perceived social support ($p<0.05$). Yet, we could not reach a significant association between participants' academic self-efficacy and digital literacy levels.

Conclusion: Overall, the participating students had an above-average level of digital literacy. Besides, we concluded year of study, parental educational attainment, the number of electronic devices owned, and perceived social support to be linked with digital literacy.

INTRODUCTION

In the digitalizing world with rapidly developing technology in recent years, people have been trying to keep up with changing communication environments and tools. While some welcome the changing technology, others are uncomfortable with it. Nevertheless, everyone has to - to some extent - integrate technological developments into their lives and adapt to the change (1).

Digital literacy necessarily becomes prominent in the face of the inevitable nature of technology (1). Gilster (1997), who first introduced the concept of digital literacy, defines the concept as the ability to search and find something through diverse electronic resources and use the information found (2). According to Eshet (2004), digital literacy encompasses beyond just "using a digital device or software." Instead, it is conceived of complex, mental, social, and emotional skills needed to utilize digital environments effectively. Activities, such as reading graphical instructions on the screen, creating unique materials, identifying the quality and validity of the information in these environments, can be considered within the scope of digital literacy. At the same time, the concept of "digital literacy" covers visual literacy (visual learning and thinking), reproduction literacy (making reproduction using text, audio, video, and pictures), multiliteracy (the ability to use hypermedia and navigate freely in the displayed information), information literacy (critical thinking, ability to search and evaluate information appropriately), and socio-emotional literacy (managing online socialization

emotionally and socially and avoiding traps, fraud, etc.) (3).

Today, the internet plays a major role in developing and maintaining social relationships. According to the Global Digital report (2021), 77.7% of people living in Turkey use the internet. Of them, 70.8% are social media users, while 90.8% use social networking applications. Besides, the COVID-19 outbreak has contributed to the use of the internet and social media. Compared to the previous year, the number of social media users increased by 13.0% this year (4). In the report of the Turkish Statistical Institute (2020), while the rate of internet users in Turkey was 75.3% in 2019, it grew up to 79.0% in 2020 (5). The use of the internet and online social networking sites is increasingly becoming an indispensable habit for people. The internet has introduced efficiency in works, reduced costs, enabled one to access information and communicate with others quickly (6). The young often use the internet to access social networking sites. Now, people share their knowledge and feelings using such sites regardless of their location, making such sites popular worldwide. Facebook, Instagram, Twitter, and YouTube are networking sites allowing one to create and post information about themselves and interact with others (6,7). By participating in public or private groups appealing to their hobbies or interests, people can express themselves as they wish and get information about the subjects of their interests. Besides, university students often participate in such groups on social networking sites to contribute to their academic and cultural backgrounds (8).

Social support is defined as emotional and informative assistance and instrumental and material aid that individuals seek from their environments during any social problems or to maintain their general well-being. The previous studies revealed a link between the use of social networking sites and social support (9,10). Virtual friendship and sharing may be noteworthy sources of social support for individuals, which is the basis of online social support. Online social support is defined as one's receiving material and moral assistance from their friends, family members, or others via the internet (11). A study found that university students often use online social networking sites to seek social support. Another study concluded that a high number of friends and posts on social media increase online social support, females have more online social support demands, and university students use social media to get more social support (12). Also, using Facebook helps university students receive online social support, and they benefit greatly from online emotional and informational support (13).

The qualifications of undergraduate students mediate how effectively they practice their professions in the future. At this point, their self-efficacy helps them be able to acquire such qualifications at a higher level (14). The concept of self-efficacy is the belief in one's own capacity to organize and implement the expected activities to be able to show specified performance (15). Academic self-efficacy, on the other hand, refers to one's belief in their ability to complete an academic task successfully. Academic self-efficacy and academic achievement co-predict each other: positive academic self-efficacy reinforces academic achievement, while academic achievement ensures more robust academic self-efficacy (16).

Previous research determined that students searching for information on the internet have increased academic self-efficacy (17). Yet, the research interest seems to miss exploring the links between digital literacy, online social support, and academic self-efficacy among students. Ultimately, the present study aimed to investigate digital literacy among undergraduate students and some related variables.

2. MATERIALS AND METHODS

2.1. Design and Sample

We used a convenience sampling technique in this descriptive study and reached out to 346 undergraduate students enrolled at the departments of nursing and emergency aid and disaster management in a state university between January and April , 2021. Since 26 participants left missing

items or submitted incomplete questionnaires, we could not evaluate their data. Therefore, our sample consisted of 320 undergraduate students. When compared to the number of students enrolled at these departments, the participation rate was 25.8%. According to this research, effect size was 0.47 and power 84%.

2.2.Pilot Study

We initially administered the scales to 20 students who were not included in the sample. Then, we considered their overall comments and recommendations and made needed corrections in the demographic information form.

2.3. Data Collection Tools

In the study, we delivered the students a questionnaire booklet including the Digital Literacy Scale (DLS), the Online Social Support Scale (OSSS), the Academic Self-Efficacy Scale (ASES), and a 22-question demographic information form.

The DLS was developed by Wan Ng in 2012 and adapted into Turkish by Hamutoğlu et al. (2017). It is a 17-item 5-point Likert-type scale with four subscales: attitude (7 items; 7-35 points), technical (6 items; 6-30 points), cognitive (2 items; 2-10 points), and social (2 items; 2-10 items). It is rated on a scale ranging from 1 (Strongly disagree) to 5 (Strongly disagree). An increase in the total score refers to an elevation in digital literacy (18).

Nick et al. (2018) developed the OSSS to measure online social support among individuals. Bişkin and Kocaayan (2020) carried out its validity and reliability study in Turkey. It was designed as a 5-point Likert-type scale (0=Never, 4=Always). The scale consists of 40 items within four subscales: esteem/emotional support, social companionship, informational support, and instrumental support. There are no reverse-scored items on the scale, and each subscale covers ten items. Higher scores on any subscale indicate increased social support on the relevant dimension (19).

Jerusalem and Schwarzer (1981) developed the ASES, and Yılmaz et al. (2017) carried out its Turkish validity and reliability study. It is a 4-point Likert-type scale rated from 1 (Does not fit me at all) to 4 (Fits me at all). There are no reverse-scored items on the scale. The higher scores on the scale correspond to increased academic self-efficacy (20).

2.4. Data Collection Procedure

We collected the data online since the students continued distance education due to the pandemic. We simultaneously sent the link of the questionnaire booklet generated on Google forms to the student representatives in all classes. The data collection process was completed after the participants filled out the surveys in the link. Since it was not possible to meet face-to-face with the participants, we located a comprehensive explanation about the study and the scales on the first page of the questionnaire booklet. Moreover, we obtained written consent from the participants. Filling out the questionnaire booklet took about 25 minutes.

2.5.Data Analysis

In the data analysis, we considered percentiles and means and performed a one-way analysis of variance, pearson correlation and post hoc tests (Tukey HSD and Games Howell multiple comparison tests). The statistic "r" value of 0.00 to 0.19 was considered no relationship; 0.20 to 0.39 was a weak relationship; 0.40 to 0.69 was a moderate relationship; 0.70 to 0.89 was a strong relationship and 0.90 to 1.00 was a very strong relationship (21). All statistical analyses were performed on SPSS 25.0, and $p<0.05$ was considered significant.

2.6.Ethical Consideration

The Ethics Committee of Burdur Mehmet Akif Ersoy University (Meeting No: 2020/12, Decision No: GO 2020/331) granted ethical approval to our study. Furthermore, we obtained relevant permissions from the School of Health Sciences, where the study was carried out, and written consent from the participants.

3. FINDINGS

Of the participants, 76.6% were females, and 65.6% perceived a middle family income. While the mothers of 51.9% had primary school education, it was the case for the fathers 42.5%. Besides, 71.6% owned a smartphone. About half of the students (50.9%) used the internet for social media, while 38.1% spent 180 minutes or more online in a day (Table 1).

Table 1. Sociodemographic Characteristics of the Participants

Sociodemographic characteristics		**n**	**%**
Gender	Male	75	23,4
	Female	245	76,6
Year of study	Grade 1	128	40,0
	Grade 2	97	30,3
	Grade 3	82	25,6
	Grade 4	13	4,1
Department	Emergency Aid and Disaster Management Disaster Management -management	151	47,2
	Nursing	169	52,8
Perceived family income	Low	35	10,9
	Middle	210	65,6
	High	75	23,4
Residence type	Family home	152	47,5
	Dormitory	82	25,6
	Separate home with friends	38	11,9
	Separate home (single)	15	4,7
	Hotel or hostel	12	3,8
	Other*	21	6,6
Maternal educational attainment	Illiterate	17	5,3
	Literate	9	2,8
	Primary school	166	51,9
	Secondary school	70	21,9
	High school	44	13,8
	Undergraduate or above	14	4,4
Paternal educational attainment	Illiterate	4	1,3
	Literate	5	1,6
	Primary school	136	42,5
	Secondary school	70	21,9
	High school	68	21,3
	Undergraduate or above	37	11,6
Electronic devices owned	Smartphone	229	71,6
	PC	61	19,1
	Smartphone, PC, and tablet	30	9,4
Time spent online in a day	Less than 60 minutes	24	7,5
	61-120 minutes	81	25,3
	121-180 minutes	93	29,1
	181 minutes or more	122	38,1
Time spent online in a day for study purposes	Less than 60 minutes	31	9,7
	61-120 minutes	123	38,4
	121-180 minutes	110	34,4
	181 minutes or more	56	17,5
For what purpose the students go online the most	Social media	163	50,9
	Education/Assignments	126	39,4
	Movies/Games	25	7,8
	News	6	1,9
Total		320	100,0

Other: * Those not residing in Burdur due to COVID-19 and distance education at the study time.

The participants' mean subscale and DLS total scores were as follows: 23.22±7.27 (attitude), 21.01±6.46 (technical), 6.60±2.22 (cognitive), 6.36±2.09 (social), and 57.21±16.47 (total score).

We concluded the students' technical and DLS total scores significantly differed by year of study (p=0.002 and p=0.039, respectively). Accordingly, the grade 1 got higher mean total and technical scores than grade 2 (p=0.001 and p=0.025, respectively) (Table 2).

There were significant relationships between perceived family income and attitude, cognitive, social, and DLS total scores (p=0.022, p=0.018, p=0.007, and p=0.023, respectively). The post hoc test revealed that those with perceived high family income obtained higher mean scores than the students with perceived low family income (p=0.031, p=0.014, p=0.005, and p=0.021, respectively) (Table 2).

Moreover, the students significantly differed on the DLS total score and all the subscales by maternal educational attainment (p=0.025, p<0.001, p=0.017, p=0.002, and p=0.001, respectively). We discovered that the students with literate mothers and mothers with an undergraduate or above degree had significantly higher attitude scores than those with illiterate mothers (p=0.030 and p=0.041, respectively). Regarding the technical subscale, those whose mothers had primary school, secondary school, high school, and undergraduate or above education obtained significantly higher mean scores than those with illiterate mothers (p=0.001, p=0.001, p=0.005, and p<0.001, respectively). Besides, the students with mothers having primary school, secondary school, and undergraduate or above education got higher cognitive scores than those with illiterate mothers (p=0.041, p=0.017, and p=0.017, respectively). On the social subscale, the participants whose mothers had a high school and undergraduate or above degree got significantly higher scores than their peers with illiterate mothers (p=0.039 and p=0.001, respectively). Finally, the students with illiterate mothers had significantly lower DLS total scores than others (p=0.020, p=0.007, p=0.010, p=0.016, and p=0.001, respectively) (Table 2).

There were statistically significant differences in the students' technical, cognitive, social, and DLS total scores by paternal educational attainment (p=0.011, p=0.017, p=0.003, and p=0.019, respectively). The students with fathers having an undergraduate or above degree obtained significantly higher technical scores than those with illiterate fathers (p=0.013). Besides, those whose fathers had undergraduate or above education had significantly higher cognitive scores than their peers with fathers with primary school education (p=0.033). Moreover, the students with fathers having undergraduate or above education had significantly higher social scores than those whose fathers with secondary school education (p=0.003). Finally, those with fathers having an undergraduate or above degree got significantly higher DLS total scores than those with fathers having primary school education (p=0.040) (Table 2).

We discovered significant differences in the students' attitude, technical, cognitive, social, and DLS total scores by electronic devices owned (p=0.007, p=0.024, p=0.010, p=0.013, and p=0.005, respectively). The attitude scores of those owning a smartphone, personal computer (PC), and tablet were significantly higher than those owning only a smartphone or a PC (p=0.009 and p=0.008, respectively). The technical scores of those owning a smartphone, PC, and tablet were significantly higher than those owning only a smartphone or a PC (p=0.021 and p=0.040, respectively). Considering the cognitive subscale, the students owning a smartphone, PC, and tablet obtained significantly higher scores than their peers with only a smartphone or a PC (p=0.010 and p=0.015, respectively). Those owing these three devices scored significantly higher on the social subscale than the students with only a smartphone or a PC (p=0.009 and p=0.039, respectively). Finally, those with a smartphone, PC, and tablet had significantly higher DLS total scores than their peers owning only a smartphone or a PC (p=0.005 and p=0.008, respectively) (Table 2).

Table 2. Relationships Between the Participants' Sociodemographic Characteristics and Scores on the Digital Literacy Scale

Sociodemographic characteristics (n=320)		n	Digital Literacy Scale									
			Attitude		Technical		Cognitive		Social		Total Score	
			M±SD	p	M±SD	p	M±SD	p	M±SD	p	M±SD	p
Year of study	Grade 1	128	23,97±6,80	[1]0,278	22,50±5,82	[2]**0,002**	6,85±2,21	[1]0,317	6,60±1,99	[1]0,157	59,92±14,83	[2]**0,039**
	Grade 2	97	22,12±7,47		19,30±6,88		6,29±2,25		5,96±2,15		53,70±17,22	
	Grade 3	82	23,47±7,69		21,03±6,16		6,63±2,17		6,43±2,09		57,58±17,00	
	Grade 4	13	22,38±7,37		19,07±8,08		6,38±2,46		6,46±2,50		54,30±19,24	
Perceived family income	Low	35	20,65±8,16	[3]**0,022**	20,0±7,62	[1]0,137	5,80±2,18	[2]**0,018**	5,51±2,25	[2]**0,007**	51,94±17,96	[2]**0,023**
	Middle	210	23,10±7,35		20,74±6,46		6,57±2,26		6,32±2,06		56,76±16,61	
	High	75	24,73±6,30		22,25±5,74		7,08±2,05		6,85±1,99		60,92±14,62	
Maternal educational attainment	Illiterate	17	18,29±8,22	[2]**0,025**	14,70±7,09	[2]**<0,001**	4,94±2,63	[2]**0,017**	4,88±1,65	[2]**0,002**	42,82±18,22	[2]**0,001**
	Literate	9	27,33±6,08		21,88±5,30		7,33±2,44		7,33±2,44		63,88±15,10	
	Primary school	166	23,31±7,05		21,01±6,10		6,58±2,07		6,27±2,00		57,19±15,55	
	Secondary school	70	22,98±7,24		21,41±6,49		6,85±2,31		6,32±2,09		57,58±16,23	
	High school	44	23,43±7,24		21,15±6,77		6,52±2,32		6,61±2,25		57,72±17,89	
	Undergraduate or above	14	25,92±6,78		25,71±4,53		7,50±1,87		7,92±1,81		67,07±13,09	
Paternal educational attainment	Illiterate	4	18,00±7,52	[1]0,180	12,75±7,88	[2]**0,011**	4,50±3,00	[2]**0,017**	5,25±2,98	[2]**0,003**	40,50±19,67	[2]**0,019**
	Literate	5	22,80±12,15		18,80±9,17		6,40±3,50		5,40±3,04		53,40±27,20	
	Primary school	136	22,63±6,90		20,71±6,06		6,28±2,19		6,20±2,02		55,83±15,58	
	Secondary school	70	23,01±7,66		20,71±7,23		6,61±2,26		6,05±2,15		56,40±17,83	
	High school	68	23,58±7,58		21,04±6,37		6,89±2,24		6,44±2,07		57,97±16,69	
	Undergraduate or above	37	25,72±6,21		23,86±4,99		7,51±1,66		7,62±1,65		64,72±12,23	
Electronic devices owned	Smartphone	229	22,96±7,36	[2]**0,007**	20,73±6,45	[2]**0,024**	6,51±2,20	[2]**0,010**	6,24±2,04	[2]**0,013**	56,46±16,39	[2]**0,005**
	PC	61	22,26±7,18		20,57±6,85		6,39±2,43		6,29±2,27		55,52±17,31	
	Smartphone, PC, Tablet	30	27,10±5,59		24,06±4,94		7,76±1,65		7,43±1,88		66,36±12,45	

[1]One-way Analysis of Variance, [2]One-way Analysis of Variance and Tukey HSD Test, [3]One-way Analysis of Variance and Games Howell Multiple Comparison Test.

We computed significant, weak, and positive correlations between the scores on the esteem/ emotional support, social companionship, and informational support subscales of the OSSS and the scores on the DLS subscales and DLS total score (p=<0.001 for all subscales). Besides, there were significant, very weak, and positive relationships between the instrumental support scores and the attitude, technical, and social scores and the DLS total score (p=0.001, p=0.017, p=0.005, and p=0.001, respectively). (Table 3).

Table 3. The Correlations of the DLS with the OSSS and the ASES

Scales		DLS Attitude	DLS Technical	DLS Cognitive	DLS Social	DLS Total Score
OSSS Esteem/ Emotional Support	Correlation	0,305	0,271	0,278	0,238	0,309
	p-value	0,001	0,001	0,001	0,001	0,001
OSSS Social Companionship	Correlation	0,242	0,207	0,276	0,229	0,255
	p-value	<0,001	0,001	0,001	0,001	0,001
OSSS Informational Support	Correlation	0,232	0,209	0,238	0,183	0,240
	p-value	<0,001	0,001	0,001	0,001	0,001
OSSS Instrumental Support	Correlation	0,183	0,134	0,201	0,156	0,180
	p-value	0,001	0,017	0,001	0,005	0,001
ASES Total Score	Correlation	0,037	-0,035	0,003	-0,006	0,002
	p-value	0,507	0,529	0,960	0,910	0,970

DLS: Digital Literacy Scale, OSSS: Online Social Support Scale, ASES: Academic Self-Efficacy Scale.
p<0.001

4. DISCUSSION

The present study explored digital literacy levels among undergraduate students and some related variables. Shopova (2014) concluded that university students who improve their skills in digital literacy and communication technologies perform better in learning and get better achievements in their studies (22). In another study by Adeoye and Adeoye (2017), high levels of digital literacy skills among undergraduate students at Nigerian universities were found to enhance learning, teaching, and research (23).

We found the mean digital literacy score to be 57.21±16.47, which indicates that the participating students have an above-average level of digital literacy. In his study, Sarıkaya (2019) found the mean digital literacy score to be 64.84±10.82 among 257 prospective Turkish language teachers enrolled at five different state universities (24). Kozan and Özek (2019) found this score to be 68.41 ± 8.23 in their study with undergraduate students (25). In a similar study, Göldağ and Kanat (2018) computed this score to be 62.99 among those studying at teaching departments (26). The literature host studies often exploring digital literacy skills among prospective teachers (24,25,26). Accordingly, the mean digital literacy scores of these students are higher than our participants

enrolled at the school of health sciences. Such differences between the scores may be because of possible differences among students in accessing electronic devices, diverse perspectives of digital literacy due to different cultural characteristics in the research places, or using digital resources at different levels.

In this study, grade 1 got significantly higher DLS total and technical scores than their grade 2 counterparts. Yet, Göldağ and Kanat (2018) concluded that grade 1 had lower digital literacy levels than grade 4 (26). In another study by Sarıkaya (2019), digital literacy was lower among the grade 1 than grade 3 (24). In the study by Akgün and Akgün (2020) on the students in social studies teaching the grade 3 had higher digital literacy levels than grade 1 (27). The contradictory results between our study and the literature may be explained with the proposition that the participating students may have lower access to electronic devices in their undergraduate years than high school years students, or they have decreased engagement in electronic device use while completing their assignments or course-related practices.

In this study, we found that the students with illiterate mothers had poorer digital literacy than their peers with mothers having advanced educational attainments. Similarly, we determined that the digital literacy levels of the students elevated as paternal educational attainment increased. Polat (2018) also concluded that advanced paternal educational background leads to increased digital literacy in their children, which overlaps our results (28). We propose that the parents with advanced educational levels may be more familiar with and conveniently access digital tools, contributing to their children's digital literacy.

On the other hand, we discovered that the more electronic devices (e.g., smartphone, PC, and tablet) the students had, the more increased digital literacy scores they obtained. Based on this finding, we can propose that the number of digital devices owned contributes to digital literacy. The research by Yaman (2019) found the digital literacy levels of prospective teachers owning a PC to be higher than others (29). In the study by Göldağ and Kanat (2018), the students with a PC had higher digital literacy levels than their peers without a PC (26). Using devices to access social media or digital resources for some reasons inevitably influences students' digital literacy.

While there were positive correlations between the OSSS and DLS scores of the participants, we could not find any significant association between academic self-efficacy and the DLS. In today's world, online social networks may create a more favorable environment for social support than face-to-face communication (30). Trepte et al. (2015) reported that online social networks become more suitable for information exchange than face-to-face communication (31). In their study, Chakradhar et al. (2009) found that approximately 40% of undergraduate students using online social networks were less anxious when communicating online than face-to-face communication. Yet, 26% of the students had an unpleasant experience due to sharing their personal information (32). In general, our results are compatible with the literature. The increase in perceived online social support may increase the time the students go online and, thus, contribute to their digital literacy.

CONCLUSION AND RECOMMENDATIONS

Overall, we discovered that the participating students had above-average digital literacy. Moreover, year of study, parental educational attainment, the number of electronic devices owned, and perceived social support were the variables associated with digital literacy. In line with these results, we may propose the following recommendations:

- To become digitally literate, the students may be engaged in improving their creative thinking skills, enriching their collaborations with other students, and progressing to mastery in digital tools to gather and utilize information.
- Information technologies should be used more in education.

- A course for digital literacy should be introduced in curricula.
- Students with computer skills and digital literacy should be directed to courses or internship practices where they can improve themselves.
- Informative sessions should be held to contribute to students' perceptions of online social support.

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