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The mediating effect of digital literacy in the relationship between media literacy and digital citizenship

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Abstract

Media literacy is a critical component for digital citizenship; however, the nature of this relationship and the role of other mediating variables such as digital literacy in this relationship are not empirically tested in various contexts. This paper examined the effect of media literacy on digital citizenship and tested the mediating role of digital literacy in this relationship. Mediation model was applied to analyze the relationships between the variables, based on data from 555 pre-service teachers in Turkey. This study revealed a direct relationship between media literacy and digital citizenship. In addition, digital literacy partially mediated the effect of pre-service teachers' media literacy levels on their digital citizenship. Results are discussed and implications for practitioners and recommendations for future research are offered.

Keywords Digital citizenship · Media literacy · Digital literacy · PROCESS model · Mediation analysis · Pre-service teachers

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1 Introduction

Citizenship practices have changed vastly recently. While citizenship in the past was limited to physical environment of the individual, the advancements of digital technologies and Web 2.0 communication technologies have altered citizenship practices, transforming it to digital citizenship (Oxley, 2010). Digital media tools regulate citizenship practices from many aspects, for example in interaction with political parties or receiving news (Shelley et al., 2004). New technologies provide new citizenship practices (Hermes, 2006). Citizens can now demonstrate their reactions in various ways using digital media tools and platforms as opposed to just voting in the elections. Media allows citizens to practice citizenship exercises in the new century including participation or criticism through offering plurality of viewpoints and multiplicity of voices (UNESCO, 2009). Digital citizenship has become a critical competency in the new century regarding the expected qualities of workforce and complex social life. Participating in online activities and virtual collaboration are essential components of digital citizenship (Connecticut State Department of Education, 2020).

Using the internet is not sufficient to qualify for digital citizenship. There is a thin line between menaces and possibilities in digital life (Common Sense Media, 2009). Digital citizenship requires many competencies including being technology-literate, perceiving realities of digital world and digital culture, practicing secure communication in the digital world, using social media actively, recognizing digital respect and privacy, and contributing to and demanding participatory democracy (Işıklı, 2015). A digital citizen can combine knowledge and attitudes with digital skills so that one can actively participate in the social life (NETSAFE, 2016). This active participation should involve practices of responsible digital citizenship (Guven, 2018) since digital citizenship includes 'norms of appropriate, responsible, and empowered technology use' (Ribble, 2022). Therefore, digital competence in the globalized context requires analyzing issues critically, a critical aspect of media literacy. As well as skillsets related to participation, democracy, human rights and social engagement, digital citizenship is also related to media literacy and digital literacy (Frau-Meigs et al., 2017). Digital citizenship involves ethical, responsible and safe use of digital technologies, and media literacy and digital literacy are the skills needed to be intentional consumers and users of digital technology (Lauricella et al., 2020), revealing an interrelationship among these three skills.

Digital citizenship, media literacy, and digital literacy emphasized above are critical for education. Although students are increasingly exposed to digital technologies each day, teachers are not offered adequate education as to the new skills required in the new century (Ribble, 2012). Teachers need to possess these skills to help students gain them. How educators can help students become competent digital citizens and the role of media literacy in helping students become critical thinkers must be a part of the discourse in the 21st century (De Abreu, 2010). Media literacy is a critical requirement for digital citizenship and should be supported through education at all levels (Gallagher, 2014; Hobbs, 2010), creating a need to understand the relationships between digital citizenship, media literacy, and digital literacy. Although there is theoretical support for the interrelationships among these concepts, empirical studies demonstrating the complicated nature of these relationships are limited. We are

not aware of any empirical quantitative studies in the literature demonstrating the relationships between these concepts. In addition, the relevant literature is based on data from Western contexts; it is not clear how these literacies and skills are experienced in different social contexts (Sarwatay et al., 2021). In their systematic review, Richardson et al., (2021) highlighted the need for empirical research studies to add to the understanding of digital literacy. Therefore, the current study aimed to explore the relationships between digital citizenship, media literacy, and digital literacy based on data from pre-service teachers from Turkey, a non-Western context. More specifically, this study tested the proposed conceptual framework that media literacy has direct effects on digital citizenship, and digital literacy has a mediating role in this relationship.

2 Conceptual Framework

2.1 Digital citizenship

Westheimer & Kahne (2004) highlighted three different types of citizenship for the development of democracy: personally responsible citizenship, participatory citizenship, and justice-oriented citizenship. A personally responsible citizen acts responsibly in the society by paying taxes or donating blood. A participatory citizen is an active member of organizations and knows how things operate in state institutions, investing one's efforts to help those in-need. A justice-oriented citizen evaluates the social, political and economic structures, defines injustices, and tries to remove the reasons of those injustices. Contemporary countries should aim to foster the second and third types of citizenship. Digital citizenship offers opportunities for actions for fostering participatory citizenship and justice oriented citizenship. Besides, digital citizenship also contributes to personally responsible citizenship. Individuals may resort to digital technologies in exerting their actions in all three citizenship practices such as using e-state applications, starting a campaign for those in-need, and creating a forum for social issues.

Although reading, writing and arithmetic were the required literacies for citizens in the past, new literacies regarding the new media are now needed. Digital citizenship is based on these new skills and literacies to promote democracy (Simsek & Simsek, 2013). Being a socio-technical phenomenon, digital citizenship includes cognitive, affective, and psychomotor skills in the digital world (Işıklı, 2015). Though there are numerous benefits of digital citizenship, various risks are also present in these environments such as cyber bullying, internet scams, addictions, harmful content and software products, and many more risks (Erdem & Koçyiğit, 2019). Therefore, media should be used critically. Ribble (2012) defined digital citizenship as norms of appropriate and responsible use of technology. Similarly, "digital citizenship is the ability for students to recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical" (International Society for Technology in Education, 2016). Digital citizenship involves being aware of one's rights, responsibilities, and opportunities in the digital environments and taking safe, legal, and ethical actions in

these environments (International Society for Technology in Education, 2016). Ribble & Bailey (2011) emphasized the elements of digital citizenship as digital access, digital commerce, digital etiquette, digital communication, digital law, digital rights and responsibilities, digital literacy, digital security, digital health, and wellness.

2.2 Media literacy

The technological mobilization and the relative fall in the costs of digital tools recently have increased people's use of media tools and platforms exponentially (Erdem, 2018). There are numerous statistics demonstrating the vast use of media across the world. The automation, portability, variety, digitalism, instant distribution, modularity, multi-layeredness, hybridization, and interaction in the new media are the characteristics that have advantages over old media and contribute to its wide use (Anderson & Balsamo, 2008; Chen et al., 2011; Jenkins et al., 2006; Livingstone, 2004). However, the people adopt new technologies without questioning (Pérez Tornero & Varis, 2010), causing new problems such as being manipulated by big media companies in every aspect of life (Torres & Mercado, 2006). Having a critical perspective towards media is therefore quite critical in the new century, requiring new skills and literacies. Media literacy is one of the critical literacies among them (Egbert & Neville, 2015).

Media literacy is a broad term, including all forms of media such as printed media, television, or new media (Potter, 2010). Therefore, the scope of media literacy expanded from traditional media to new media (Livingstone, 2004). There are various definitions of media; however, the media literacy definition provided in the National Leadership Conference on Media Literacy is the most accepted one. According to this definition, media literacy is "the ability to access, analyze, evaluate and create media in a variety of forms" (Aufderheide, 1993). This definition is a functional one because it comprises all basic skills and embodies all media tools. Media literacy aims to protect people from the negative effects of mass media (Potter, 2010); however, it is not limited to protection. The adopted definition includes four basic media literacy skills. *Access* involves obtaining useful information and comprehending its meaning efficiently using media tools (Jolls, 2008). *Analyze* is the most significant sub-skill of media literacy because the main goal of media literacy is to achieve critical autonomy in interaction with media (Aufderheide, 1993). Analysis is dividing a whole into meaningful units. In media analysis, the author, purpose, audience, format, type, perspective, characters, themes, mood, and context of the media message is questioned (Hobbs & Moore, 2013; Thoman & Jolls, 2005). *Evaluate* complements the former skills. It is coming up with a judgment regarding the value of the media contents using various standards, criteria, or principles. The last skill, *communicate*, involves creating media contents and sharing it with other people (Schmidt, 2013). This skill transforms the individual from media consumer to media producer. Some scholars add a fifth skill of participation (Jolls, 2008; Thoman & Jolls, 2004) or act (Hobbs, 2010); however, these skills are embodied in *communicate.* With this skill, individuals create media contents, share them with other people and hence participate in social life, express themselves, claim their rights and initiate or support social campaigns, which are practices that support civic engagement and

digital citizenship. The norms of the new digital culture necessitates media literacy to prioritize civic intentionality through gathering people in seek of solving problems, creating dialog, or meaning making (Mihailidis, 2018).

2.3 Digital literacy

The rapid advancements in digital technologies required people to make use of technical, cognitive, and social skills, and these skills embody digital literacy (Eshet-Alkalai & Amichai-Hamburger, 2004). Digital literacy is the ability to "use technology competently, interpret and understand digital content and access its credibility, and create, research, and communicate with appropriate tools" (Common Sense Media, 2009). Gilster (1997, p. 2) first used the term digital literacy as "the ability to both understand and use digitized information". It can also be defined as "the skills associated with using technology to enable users to find, evaluate, organize, create, and communicate information" (Adult and Community Learning Services, 2019). Digital literacy involves cognitive and social skills as well as technical skills, and five major digital skills in digital literacy include photo-visual skills, reproduction skills, branching skills, information skills, and socio-emotional skills (Eshet-Alkalai & Amichai-Hamburger, 2004). A digitally literate individual can adapt to the new technologies and use them efficiently (Ng, 2012). Digital competence (skills, concepts, approaches, and attitudes), digital usage (professional/discipline application), and digital transformation (innovation/creativity) are three levels of digital literacy (Martin & Grudziecki, 2006). An individual can practice digital literacy at any level, and this level of use affects one's social practices. In line with the new and multi literacies approach, some scholars consider digital literacy as an umbrella term for new literacies needed in the new century such as information literacy, computer literacy, visual literacy, and so on (Covello, 2010; Lankshear & Knobel, 2006). However, the complexities of the social life in the century urged researchers to make distinctions among new literacies and study them as independent literacies without ignoring the overlapping structure of the relationships among them. Therefore, there is a need for exploring the nature of the relationships among digital citizenship, media literacy, and digital literacy.

2.4 The relationships between digital citizenship, media literacy, and digital literacy

Digital tools and platforms have become an essential part of citizenship practices today. Digital citizenship requires safe, legal, and ethical behaviors while using digital media (Common Sense Media, 2009). Therefore, digital citizens need to possess certain set of literacies to operate effectively in the new century. This study therefore explores relationships among digital citizenship, digital literacy, and media literacy. Media literacy allows the individual to have a critical autonomy in interaction with media. Through media literacy, one has a conscious use of media tools and platforms, analyzes and evaluates media contents, creates media contents to express oneself, participates in social life, solves problems using digital platforms, and claims one's rights. These practices are critical for digital citizenship. There is empirical evidence

suggesting that media literacy enhances digital citizenship practices (Kahne et al., 2012; Martens & Hobbs, 2015; Park et al., 2021).

The pervasive increase in internet access and the related practices require individuals to have digital literacy skills at a certain level to take advantage of it (Shelley et al., 2004). Digital literacy skills empower individuals to navigate in digital environments in an informed and knowledgeable way (Berson & Berson, 2003). Digital literacy is actually considered as an element of digital citizenship (Ribble & Bailey, 2011). Digital literacy is not limited to use of technical skills in interaction with digital technologies. It is actually a social practice (Lankshear & Knobel, 2006). There are technical, cognitive, and social-emotional aspects of digital literacy (Ng, 2012). However, we emphasized the technical aspect of digital literacy in the current study. The instrument we used to measure pre-service teachers' digital literacy also focused on technical skills. Digital literacy often refers to effective use of information and communication technologies (Koltay, 2011). From the technical aspect, a digitally literate person can employ technical and operational skills in using digital technologies in one's life (Ng, 2012).

Choi (2016) performed a concept analysis for digital citizenship based on an extensive literature review and revealed that ethics, media and information literacy, participation/engagement, and critical resistance were the four major categories that constitute digital citizenship. These categories complement each other, and the media and information literacy category demonstrates the need for access to and use of digital technologies, and ensuring critical use of these technologies. These skills refer to media literacy. Besides, ethics, participation/engagement, and critical resistance are closely related to media literacy. Hence, we can argue that media literacy affects digital citizenship. In addition, one needs to rely on technical skills while exerting these practices. The technical skills employed in using digital technologies refer to digital literacy. Through media literacy, one achieves critical autonomy while using these technologies, and digital literacy expedites these practices. Therefore, we argue that digital literacy has a mediator role in the relationship between media literacy and digital citizenship. We propose that an individual's media literacy skills can predict one's digital citizenship practices through digital literacy, which means the effect of media literacy on digital citizenship can be explained by digital literacy.

3 Purpose of the study

Based on the conceptual framework above, this study aimed to explore the mediating effect of digital literacy in the relationship between media literacy and digital citizenship. Additionally, it aimed to unearth the pattern of the relationships among digital citizenship, media literacy, and digital literacy. The following hypotheses guided the study:

H1: Digital literacy mediates the relationship between media literacy and digital citizenship.

H1a: Media literacy affects digital literacy significantly.

H1b: Digital literacy affects digital citizenship significantly.

H1c: Media literacy affects digital citizenship significantly.

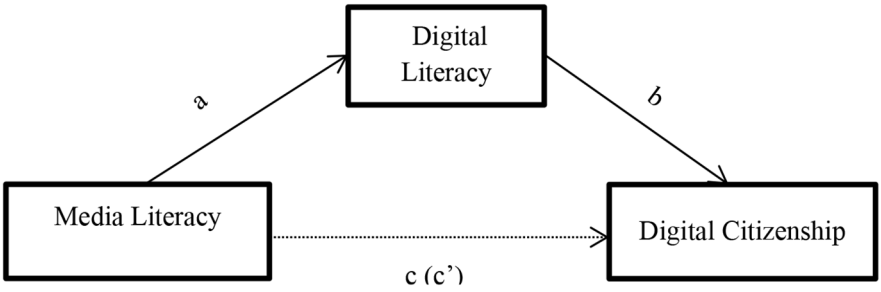

Fig. 1 Research Model

4 Method

The study was designed as a mediation model to test whether digital literacy mediates the relationship between media literacy and digital citizenship. Mediation model was used to examine how the pre-service teachers' media literacy affects digital citizenship through digital literacy. It refers to considering how a third variable affects the relationship between two other variables (MacKinnon et al., 2007). In this model, media literacy is the independent variable, digital citizenship is the dependent variable, and digital literacy is the mediator. The model is shown in Fig. 1.

As seen in Fig. 1, path *a* demonstrates the direct effect of media literacy on digital literacy; path *b* demonstrates the direct effect of digital literacy on digital citizenship; path *c* demonstrates the direct effect of media literacy on digital citizenship; and path c' demonstrates the indirect effect of media literacy on digital citizenship through digital literacy. The data were analysed using the Process Macro in SPSS. This analysis is based on the approach of bootstrapping to obtain confidence intervals. Bootstrapping requires no assumptions about the distribution of data to estimate effect-size and test hypotheses. Using this technique enables users to analyze mediation models with a simple command (Preacher & Hayes, 2004).

4.1 Participants and data Collection

The participants of this study were 555 pre-service teachers studying in six Faculties of Education at different universities from different parts of Turkey from north to south, and from western regions to eastern regions. They studied in 12 departments (Primary School Teaching, Pre-school Education, Turkish Language Teaching, Special Education, Psychological Counseling and Guidance, German Language Teaching, Physical Education, Science Education, Social Sciences Education, Primary School Mathematics Education, Arabic Language Teaching, and English Language Teaching). They were recruited via convenience sampling from state universities in Turkey. The researchers contacted their colleagues at different universities throughout Turkey, and they distributed the link to students who participated in the study voluntarily. The data were collected in spring semester of 2020–2021 academic year. 26,3% (n: 146) of the participants are males while 73,7% (n: 409) are females. As for grade, there are students from all grades, from the 1st year to the 4th year. 29,4% (n:

Table 1 Confirmatory Factor Analysis

Variable	X^2/df	CFI	GFI	AGFI	NFI	RMSEA
Media Literacy	2.89***	0.82	0.80	0.78	0.75	0.06
Digital Literacy	2.63***	0.97	0.97	0.95	0.95	0.05
Digital Citizenship	2.47***	0.96	0.94	0.92	0.94	0.05

Note. ***$p<0.001$; df=degrees of freedom; GFI=Goodness of fit index; CFI=Comparative fit index; AGFI=Adjusted goodness of fit index; NFI=Normed fit index; RMSEA=Root means square error of approximation

163) of the participants were freshman while 16% (n: 89) were sophomores. 40,7% (n: 226) of them were juniors, and 13,9% (n: 77) were seniors.

4.2 Instruments

4.2.1 Digital citizenship scale (DCS)

DCS was originally developed by Choi et al., (2017) to measure individuals' levels of digital citizenship, and it was adapted to Turkish by Erdem & Koçyiğit (2019) with university students. The scale is a seven-point Likert type scale, and the adapted version has 18 items in the factors of 'internet political activism, technical skills, local/global awareness, critical perspective, and networking agency'. The reliability and validity of the adapted version were reported in Erdem & Koçyiğit (2019).

4.2.2 Media literacy skills scale (MLSS)

MLSS was developed by Erişti & Erdem (2017) for measuring pre-service teachers' levels of media literacy skills in a similar context in Turkey. MLSS is a five-point Likert type scale with 45 items in the factors of 'access, analyze, evaluate, and communiate'. The scale was reported to be valid and reliable in its development report (Erişti & Erdem, 2017).

4.2.3 Digital literacy scale (DLS)

Digital Literacy Scale was developed by Ng (2012) and adapted to Turkish by Üstündağ et al., (2017). The scale consists of 10 items and a single factor. The lowest point from this scale is 10, while the highest is 50. Factor loadings of the scale items varied between 0.46 and 0.74 according to the exploratory factor analysis result. In the scale; 10 items fall into one factor and explain 40% of the total variability. The Cronbach's Alpha internal consistency coefficient was calculated as 0.86 for the scale (Üstündağ et al., 2017).

4.3 Validity and reliability

Average Variance Extract (AVE) coefficients were calculated to test convergent validity of the scales. For convergent validity, the CR coefficients should be higher than the AVE coefficients, and the AVE coefficients should be higher than 0.50 (Zait & Bertea, 2011). Table 2 reveals that the variables have convergent validity. In addi-

Table 2 Convergent Validity and Reliability Analysis

	CR	AVE	α
Media Literacy	0.95	0.56	0.95
Digital Literacy	0.89	0.66	0.86
Digital Citizenship	0.89	0.56	0.88

Note. CR = Composite reliability, AVE = Average variance extract, α = Cronbach alpha,

tion, when the square roots of the AVE coefficients are compared with the correlation coefficients between the variables (see Table 4), the fact that the square roots of the AVE coefficients are higher than the correlation coefficients indicates the discriminant validity of the constructs (Fornell & Larcker, 1981).

Construct validity of the measures needed to be ensured before testing the mediation model. Construct validity was tested with Confirmatory Factor Analysis (DFA) using the AMOS 23 program. Table 1 shows the confirmatory factor analysis results.

In order to ensure construct validity, x^2/df ratio should be below 3, RMSEA should be below 0.10, and the other indices should be below 1 (Kline, 2011). Table 1 shows that all the scales meet these criteria. It is indicated that the 4-dimensional and 45-item structure of the media literacy scale, the one-dimensional and 10-item structure of the digital literacy scale, and the 5-dimensional and 18-item structure of the digital citizenship scale were confirmed.

Convergent validity includes evaluating scales against each other without using an external measure (Kline, 2011). AVE coefficients were calculated to test convergent validity of the scales. Additionally, reliability analysis was performed using Cronbach Alpha and composite reliability (CR) coefficients. Cronbach Alpha and CR coefficients are shown in Table 2.

As indicated in Table 2, the variables have convergent validity. For convergent validity, the CR coefficients should be higher than the AVE coefficients, and the AVE coefficients should be higher than 0.50 (Zait & Bertea, 2011). In addition, when the square roots of the AVE coefficients are compared with the correlation coefficients between the variables (see Table 4), the fact that the square roots of the AVE coefficients are higher than the correlation coefficients indicates the convergent validity of the constructs (Fornell & Larcker, 1981). Cronbach Alpha and composite reliability coefficients indicate the reliability of the measures, since both should be over 0.70 (Hair et al., 2013). The scales measuring the three variables are found out to be valid and reliable.

5 Results

Normality of the data was tested through Skewness (-0.218) and Kurtosis (1.087) measures. Since the values were between −1.5 and +1.5, it was proved that the data showed a normal distribution (Tabachnick & Fidell, 2013). Table 3 shows the means and standard deviations of the variables.

Media literacy and digital literacy scales are 5-point Likert and digital citizenship scale is 7-point Likert. Table 3 reveals that the means of the three variables are above the average. Pearson correlation analysis was used to examine the relationship

Table 3 Means and Standard Deviations of Media Literacy, Digital Literacy, and Digital Citizenship

Variables	*Mean*	*Standard Deviation*
1. Media Literacy	3.94	0.46
2. Digital Literacy	3.59	0.62
3. Digital Citizenship	3.98	0.95

Table 4 Pearson Correlation Analysis among the Variables

Variables	1	2	3
1. Media Literacy	0.75		
2. Digital Literacy	0.70^{***}	0.81	
3. Digital Citizenship	0.44^{***}	0.48^{***}	0.75

Note. $^{***}p<0.001$, *Diagonal shows the square root of AVE*

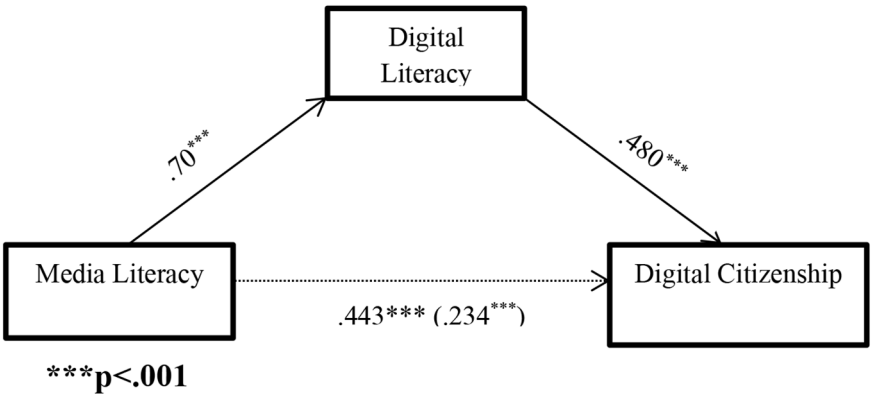

Fig. 2 Mediation Model

between media literacy, digital literacy and digital citizenship. The findings are presented in Table 4.

As seen in Table 4, positive relationships were observed among media literacy, digital literacy, and digital citizenship. The model of the study was tested using SPSS PROCESS v3.3 (Hayes, 2013). Figure 2 shows the mediation modelling results.

As indicated in Fig. 2, media literacy has a direct effect on digital literacy, and digital literacy has a direct effect on digital citizenship. In order to determine the mediating effect in the analysis, the parameters to be considered are indirect (0.234***) and total (0.443***) effect values. The standard beta coefficients show the indirect effect of media literacy on digital citizenship through digital literacy. As the direct effect was still significant after digital literacy was included in the model, it was a partial mediation model. Table 5 illustrates β coefficients and Bootstrap confidence intervals.

Moderation analysis was performed using the Bootstrap method at 95% confidence level. 10,000 different indirect effects are calculated by selecting 10,000 different samples from the sample in the Bootstrap method. These effects are used to

Table 5 *Coefficients for Mediation Model and Bootstrap Confidence Intervals*

Variables	β	LLCI	ULCI
Direct Effect	0.700^{***}	0.8575	1.0170
Media Literacy- Digital Literacy	0.334^{***}	0.3592	0.6719
Digital Literacy – Digital Citizenship	0.208^{***}	0.2220	0.6404
Media Literacy - Digital Citizenship			
Indirect Effect	0.234^{***}	0.1558	0.3140
Media Literacy - Digital Literacy – Digital Citizenship			
Total Effect	0.443^{***}	0.7597	1.0691
Media Literacy - Digital Citizenship			

*Note.*** $p<0.001$

determine the lower and upper limits of the 95% confidence interval (CI). As long as there is no zero (0) value between the lower (LLCI) and upper (ULCI) values, the relationships in the model are significant (Hayes, 2013). As seen in Table 3, confidence interval values of the indirect effect were calculated at the lower (LLCI: 0.155) and upper (ULCI: 0.314) limits. The fact that both values are positive indicates that the mediation model is acceptable. It shows that digital literacy mediates the relationship between media literacy and digital citizenship.

6 Discussion

This study explored the mediating role of digital literacy in the relationship between media literacy and digital citizenship. Although theoretical studies argued that digital literacy and media literacy are the needed elements for digital citizenship, there were not any studies testing the complicated relationships among these concepts. Based on the literature and theoretical framework, this study proposed that digital literacy may be a mediator in the relationship between media literacy and digital citizenship, which is the main hypothesis of the study. The main hypothesis of the study is discussed below after visiting the sub-hypotheses.

The first sub-hypothesis stated that media literacy affects digital literacy. The analysis supported this hypothesis, revealing that media literacy is a strong predictor of digital literacy. Indeed, media literacy and digital literacy complement each other. The competencies of media and digital literacies overlap (Koltay, 2011). Particularly, the competencies related to the "access" dimension of media literacy are related to digital literacy. Regarding access dimension of media literacy, one needs to possess a certain level of knowledge and skills with respect to the use of media tools (Hobbs, 2010; Jolls, 2008; Pérez Tornero & Varis, 2010). Collecting information using various media tools is an access related competency (Hobbs & Moore, 2013). On the other hand, media literacy is about gaining critical autonomy in the relationship with media (Aufderheide, 1993). Therefore, a media literate individual would use information and communication technologies more critically and consciously. Similarly, digital literacy requires people to navigate in digital environments in an informed and knowledgeable way (Berson & Berson, 2003). Digital literacy is actually a social practice (Lankshear & Knobel, 2006). The nature of media literacy enhances also one's digital literacy skills. For an individual to move beyond digital competence

and digital use, and achieve digital transformation, which involves innovation and creativity (Martin & Grudziecki, 2006), one needs to get help from media literacy. On the other hand, digital literacy focuses on not only media but also various other technology related aspects ranging from hardware to software, from accessing information to being able to deal with technological problems. While digital literacy is characterized as instrumental or deterministic, media literacy is about meaning making with regard to media texts (Potter, 2017). In this sense, this study also aimed to investigate whether digital literacy, which requires more technical knowledge about technology, makes a difference in addition to media literacy. In other words, whether individuals with more technical knowledge, in contrast to having only media literacy, makes a difference in digital citizenship was checked.

The second sub-hypothesis, that digital literacy affects digital citizenship, was also accepted in the current study. Citizenship practices have transformed with the digitalization in every walk of life. The elements of digital citizenship, which are digital access, digital commerce, digital etiquette, digital communication, digital law, digital rights and responsibilities, digital literacy, digital security, digital health, and wellness (Ribble & Bailey, 2011), all require competence in digital tools. Digital literacy allows one to employ technical and operational skills in using digital technologies (Ng, 2012). For example, participating in online activities and virtual collaboration are essential components of digital citizenship (Connecticut State Department of Education, 2020), and individuals rely on their digital literacy while exerting these digital citizenship practices. Besides, digital literacy helps people protect themselves from digital menaces, which also increases participation in social life through digital environment.

The third sub-hypothesis was about testing the effect of media literacy on digital citizenship. Based on the theoretical (Gallagher, 2014; Hobbs, 2010) and empirical studies (Kahne et al., 2012; Martens & Hobbs, 2015), we thought that media literacy affected ones' digital citizenship practices. The analysis supported this argument. Media literacy is actually proposed as one of the major categories that construct digital citizenship (Choi, 2016). Critical use of digital tools is a major competency in digital citizenship and one can achieve this through media literacy. Media literacy involves a critical stance (Aufderheide, 1993; Livingstone, 2004). The 'analyze' and 'evaluate' dimensions of media literacy are closely related to this critical stance (Jolls, 2008; Pérez Tornero & Varis, 2010; Potter, 2010). Besides, 'communicate' skill in media literacy is about creating media messages, sharing them with other people (Schmidt, 2013), participating in social life, and solving various problems using media tools and platforms (Erişti & Erdem, 2017; Hobbs, 2010; Thoman & Jolls, 2005). These practices are the practices of digital citizenship. Intervention studies also support these arguments. Park et al., (2021) reported that media literacy education had a significant effect on individuals' digital citizenship. In the same vein, media literacy education increased online political engagement among young people (Kahne et al., 2012), which is an indicator of digital citizenship.

The main hypothesis of the study was that digital literacy mediates the relationship between media literacy and digital citizenship. As discussed in the previous paragraph, media literacy affects individuals' digital citizenship. We also hypothesized that there may be some mediator variables in this relationship. One of these variables

was digital literacy. Media literacy equips one with critical autonomy in interaction with media and urges one to participate in social life and solve problems using digital tools and environments. However, these practices require adeptness in digital competence. Using the affordances of digital media, people can write blogs about issues, create or circulate political content, start or join political groups, connect with other people, raise funds, and solve problems (Kahne & Bowyer, 2019). We argue that people employ their media literacy skills while performing these digital citizenship practices, and they also resort to their digital literacy skills in this process. Digital literacy, therefore, mediates the effect of media literacy on digital citizenship.

The data analysis on the current study confirmed this argument, and the main hypothesis of the study was accepted. The mediation model proposed in this study (Fig. 1) was acceptable. The study evidences that digital literacy mediates the relationship between media literacy and digital citizenship. It was indicated that an individual's media literacy skills predicted one's digital citizenship practices through digital literacy. It means that digital literacy is one of the variables which explains the effect of media literacy on digital citizenship. However, the mediation was partial because the direct effect of media literacy on digital citizenship was still significant after digital literacy was included in the model. This also demonstrates that there may be other variables that mediate this relationship. Critical thinking and civic engagement may be other factors mediating this relationship.

7 Limitations and future directions

This study has various limitations that should be considered in the interpretation of the results. First, the data were collected online resorting to convenience sampling among pre-service teachers. Since media literacy, digital literacy, and digital citizenship are critical skills to possess in the new century and teachers are expected to teach them, we aimed to gather data from pre-service teachers. They are both young adults using these literacies, and they are expected to teach in a short period of time. Further studies may employ participants with different background and characteristics, which will increase data diversity. Second, this is a cross-sectional study. Therefore, we cannot argue causality between the variables. The analysis only demonstrates the strength of the relationships among the variables. Given the inadequate empirical support in the literature, further studies may employ experimental and longitudinal designs. Third, this study is the first one to explore the relationships among digital citizenship, media literacy, and digital literacy using a mediation analysis in the literature. The study revealed a partial mediation, indicating that there may be other mediating variables in the relationship between media literacy and digital citizenship. Therefore, both replication of this study in different contexts, and more research studies involving different variables such as critical thinking or civic engagement may help us better understand the nature of the relationships among these concepts.

8 Conclusion

The theoretical work on digital citizenship emphasized that media literacy is critical for digital citizenship (Choi, 2016; De Abreu, 2010; Gallagher, 2014; Hobbs, 2010). Limited intervention studies also confirmed that media literacy education contributed to individuals' digital citizenship practices (Kahne et al., 2012; Kahne & Bowyer, 2019; Martens & Hobbs, 2015; Park et al., 2021). However, the nature of this relationship and the mediating factors such as digital literacy were not empirically tested. Besides, more empirical studies from different contexts are needed as the literature depends on Western contexts and people across the world experience the new media in different contexts (Sarwatay et al., 2021). Therefore, this study tested the hypothesis that media literacy has a direct effect on digital citizenship and digital literacy mediates this relationship, based on the data from pre-service teachers in Turkey. Pre-service teachers are both young adults using media intensely, and they will be teaching students in a short period of time. Media literacy, digital literacy, and digital citizenship should be explicitly and implicitly taught to students in the schools due to their immense use in social and work life in the new century (Berson & Berson, 2003; De Abreu, 2010; Hobbs, 2010; Ribble, 2012). This study confirmed this hypothesis and revealed the mediating role of digital literacy in the relationship between media literacy and digital citizenship.

Students, teachers, and parents should be educated regarding digital citizenship through disseminating a related curriculum, providing teacher training, and raising awareness among parents (Common Sense Media, 2009). The results of this study signal to the practitioners that media literacy should be one of the basic components of this education, and it should also enhance individuals' digital literacy. Without adeptness in digital literacy, media literacy education would be inefficient for developing individuals' digital citizenship. Besides, this study also unearthed a partial mediation, indicating the need for researching different mediator or moderator variables, such as critical thinking or civic engagement. Critical thinking is an essential part of media literacy (Aufderheide, 1993; Livingstone, 2004), and it may be mediating the effect of media literacy on digital citizenship. Civic engagement is about participation in social life for various reasons such as improving others' lives or shaping the future of the society (Adler & Goggin, 2005). The skills acquired through media literacy education were found to contribute to young people's intent toward civic engagement (Martens & Hobbs, 2015). Media literacy impels citizens' engagement (UNESCO, 2009), which is an indication of digital citizenship. Further empirical research may dwell on these and many more variables.

Data Availability The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Conflict of interest None.

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