

Digital Literacy and Online Social Capital

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Purpose: Digital literacy fosters social advantages such as chances to interact with others and forge and develop social relationships by enabling online activities and leading to online social capital development. This study investigated the relationship between digital literacy and online social capital.

Methodology: The research method is quantitative, descriptive, cross-sectional, and correlational. Participants comprised 754 (520 female and 234 male) students of Tabriz universities during the months of June and August 2023, who were randomly selected from among those willing to cooperate and responded to the Digital Literacy Questionnaire (Ng, 2012) and Online Social Capital Questionnaire (Duradoni et al., 2022). Data were analyzed using confirmatory factor analysis and structural equation modelling with SPSS version 27 and Amos Graphic version 24 software.

Findings: Utilizing confirmatory factor analysis, the factorial structure of the research instruments was examined. The digital literacy questionnaire's three-factor structure and the online social capital questionnaire's two-factor structure were confirmed. The GFIs were higher than 0.9, and the RMSEA was below 0.08. The fit indices indicate that the structural model describing the relationship between digital literacy and online social capital is supported. The standard weights of the confidence and connectedness dimensions of the relationship between digital literacy and online social capital were 0.42 and 0.48, respectively ($p < 0.05$).

Conclusion: Digital literacy encompasses social, cognitive, and emotional skills in addition to technical ones. Therefore, digital literacy is multidimensional and lays the foundation for a new, constantly evolving style of online relationships and interpersonal connections. Higher levels of digital literacy and its components provide individuals with the ability and opportunity to convert their network of relationships into other forms of capital, obtain and provide support in the virtual space, and engage in emotional exchange, group leisure time, counselling, and collaboration. These competencies form the basis of online social capital.

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Introduction

The rapid advancement and evolution of digital technology possess the capacity to reshape society and fundamentally diminish inequality and poverty. Proficiency in digital literacy is essential for effectively utilising the Internet and efficiently accessing information online. Empirical data from emerging economies substantiates that digital technologies afford users with access to valuable information pertaining to markets, careers, health, education, and financial services (Ali et al., 2023; Hjort & Tian, 2021). However, their advantages depend on ancillary expenditures, such as infrastructure and expertise, that enable successful use of these technologies. Hence, the acquisition of digital literacy plays a crucial role in improving economic opportunities, leading to overall human development and the elimination of poverty (Ragnedda, 2018). As a result, having a solid grasp of digital literacy may help people become more informed consumers of online media, which has a beneficial impact on social and political behavior (Hargittai & Micheli, 2019). A lack of digital literacy is a crucial roadblock to eliminating the digital gap. The most frequent excuse for why people do not use the Internet is digital literacy, defined as the capacity to access and efficiently obtain information online (Ali et al., 2023).

The definition of digital literacy has changed as a result of people using a variety of technologies efficiently for communication, knowledge production, and information distribution within digital communities (List, 2019). Morgan et al. (2022) define digital literacy using a tridimensional framework. Information technology proficiency requires technical capabilities—individual operational literacy. The cognitive talents to seek, assess, analyze, evaluate, synthesize, and communicate digital information are second. This cognitive component emphasizes information usage, invention, and sharing. Third, internet etiquette ensures acceptable and relevant behavior. This includes legal and ethical literacy and social dimensions of digital communication in personal and professional settings. These three digital literacy skills grow together—technical and cognitive digital competency overlap. Technical and cognitive skill acquisition requires legal, ethical, and social knowledge.

Digital literacy fosters social advantages such as chances to interact with others and forge and develop social relationships by enabling online activities (Vodř et al., 2022). Social capital is a crucial component of this possibility and accomplishment. The concept of having social capital via connecting to others using information communication technologies (ICTs) can be considered online social capital. Social media capital is the social capital an individual develops and sustains on social networks (Duradoni et al., 2022).

Digital capital is a more general idea that Ragnedda (2018) views as including digital literacy. The idea of capital used here is consistent with Bourdieu's theory (Bourdieu, 1986), which goes beyond economic considerations to include internal and external resources that can be productive and profitable in other contexts and interact incredibly with other forms of capital (such as social, cultural, economic, and the like) are intertwined. By bridging the gap between the online and offline worlds, digital capital helps people have more opportunities in life (Addeo et al., 2023). It also offers economic benefits like job openings, access to online services, and online shopping and supports political interests by fostering civic engagement and political participation (Addeo et al., 2023; Ragnedda, 2018).

Several studies have examined the relationship between Facebook and social capital development. Facebook was created to increase social capital or keep it active by sharing posts, photos, and private chats with "friends." In an intriguing study, Kahai and Lei (2019) found that Facebook interacts with conventional media for connection development. Facebook supports connecting social capital more with conventional media, even when rarely utilized. Another study found that users' social capital increases, especially when communicating with older friends (Kahai & Lei, 2019). We apply the same thought process as past social media research when assessing Instagram's broad use. You may connect with other Instagram users by following an "influencer" or replying to their photos or videos (McKneely et al., 2020). Several research shows that Instagram is the best social media for increasing social capital, especially social support (Masciantonio et al., 2021).

Ragnedda (2018) believes that digital literacy plays an essential role in digital capital and can expand relationships and links in social networks and turn them into capital. On the other hand, Duradoni et al. (2022) expanded the idea that a new generation of capital can be defined as online social capital. In this regard, this research examines the relationship between digital literacy and online social capital. Although Ragnedda (2018) and Duradoni et al. (2022) have highlighted the theoretical connection between digital literacy, skill, and ICT proficiency, a thorough examination of existing research literature reveals that this relationship has not been quantitatively assessed in practice, and there is currently no conclusive evidence in this domain. This research aimed to investigate the correlation between digital literacy and online social capital to provide evidence on the nature and strength of their relationship. Considering the aforementioned research and incorporating Ng's operational model on digital literacy (Nichols & Stornaiuolo, 2019) and Duradoni's model on online social capital (Duradoni et al., 2022), the primary hypothesis of this study can be summarized as follows: There is a relationship between digital literacy and online social capital and its dimensions.

Methodology

The research design was descriptive and correlational. Populations from Tabriz University and Islamic Azad University in Tabriz participated in the study. The research was conducted between June and August of 2023. Initially, virtual networks, student organizations, and groups were contacted, and a roster of individuals interested in collaborating was compiled. Based on Kline's instructions (2015), a minimum of 20 individuals is needed as a sample for each distinct variable. Since the research model consists of 17 distinct variables, a total of at least 340 individuals are required as a sample. Due to the lack of precise estimation regarding the response and return rates, the questionnaire was distributed to all individuals who expressed their willingness to cooperate. The inclusion criteria for this study were enrollment in universities in Tabriz, willingness to participate, and completion of questionnaires.

Out of 800 students willing to cooperate, 754 returned the questionnaires, 520 participants were female (69%), and 234 were male (31%). Data analysis was conducted using SPSS version 27 and Amos graphic version 24 software.

The research data was collected using the following two valid questionnaires:

1- Digital Literacy Questionnaire: This questionnaire was designed by Ng (2012) and contains ten items and measures digital literacy in three dimensions: technical (e.g. I know how to solve my own technical problems), cognitive (e.g. I am familiar with issues related to web-based activities, e.g. cyber safety, search issues, plagiarism), and social-emotional (e.g. ICT enables me to collaborate better with my peers on project work and other learning activities). The participants scored their level of agreement with each item based on a 5-point Likert scale from strongly disagree = 1 to strongly agree = 5. Cronbach's alpha of the questionnaire is reported between 0.87 and 0.90 (Ng, 2012). In the current study, Cronbach's alpha and McDonald's omega coefficients were 0.83 and 0.82 for the technical dimension, 0.85 and 0.86 for the cognitive dimension, and 0.89 and 0.90 for the social-emotional dimension, respectively.

2- Online Social Capital Questionnaire: The online social capital questionnaire was designed by Duradoni et al. (2022) and includes seven items and two sub-reasons: Confidence in social media (e.g. I feel comfortable using social media) and social media connectedness (e.g. I have become more connected to people in similar life situations through social media). The participants scored their level of agreement with each item based on a 5-point Likert scale from strongly disagree = 1 to strongly agree = 5. The creators of this questionnaire used exploratory and confirmatory factor analysis to check the factor structure. Also, they used McDonald's omega index to show reliability and obtained 0.81 and 0.86 in the two mentioned factors, respectively. In the current study, Cronbach's alpha and McDonald's omega coefficients were obtained at 0.83 and 0.82 for confidence in social media, respectively, and 0.85 and 0.86 for connecting to social networks.

Translation of questionnaires: Because, forward-backward translation is a practical translation method (Maneesriwongul & Dixon, 2004), it was employed to translate questionnaires. A summary of translation steps is presented in Fig. 1. First, two bilingual sociologists translated both questionnaires from English to

Persian. Afterward, a committee of experts in English literature, and sociology (holding academic ranks of assistant professor or higher) combined and integrated the translated versions. Two other bilinguals (professional translators) back-translated this version into the original language without access to the original questionnaire. In the next step, the committee compared the two English back-translated drafts of both questionnaires to investigate and resolve the existing incompatibilities. After the first evaluation, the other two bilinguals, who were blind to the original version and the first translation, translated the English back-translated version into Persian. Then, the drafts were revised and compared by the committee. Moreover, all translation steps and drafts were reviewed, and the final accepted draft was prepared. This final step confirmed that the Persian draft of both questionnaires is compatible with the original English edition. Figure 1 presents a summary of steps in forward-backward translation method.

Data analysis: Confirmatory factor analyses were used to assess the measurement model. Next, structural equation modeling was used to examine the hypothesized pathways between marital quality, loneliness, and Internet infidelity. Model fit was evaluated using the Tucker-Lewis Index (TLI), Root-Mean-Square Error of Approximation (RMSEA), and Comparative Fit Indices (CFIs). CFI values of >0.95 represent an exceptional fitting model, and >0.90 indicate reasonable fit; RMSEA values <0.05 suggest excellent model fit, and values between 0.05 and 0.08 indicate reasonable fit. AMOS21 was used to fit both measurement and structural models.

Findings

The mean and standard deviation of the age of women were 22.41 and 1.99, respectively, and 22.16 and 2.86 for men.

Measurement model: Confirmatory factor analyses of the two first-order latent constructs (Digital Literacy Questionnaire and Online Social Capital Questionnaire) showed adequate fit to the data (Goodness of Fit Indices [GFIs] and CFIs >0.90 , RMSEAs <0.08). Standardized factor loadings ranged from 0.41 to 0.84 for digital literacy and 0.36 to 0.96 for online social capital.

Table 1. Means, Standard Deviations, and Correlation of Variables Matrix

variables		Technical	Cognitive	Social-emotional	Confidence	Connectedness
Digital literacy	Technical	1				
	Cognitive	.77**	1			
	Social-Emotional	.69**	.61**	1		
Online social capital	Confidence	.73**	.72**	.60**	1	
	Connectedness	.55**	.52**	.28*	.726**	1
Mean		22.98	7.53	7.55	14.84	10.86
Standard deviation		4.50	2.31	1.84	3.56	2.99

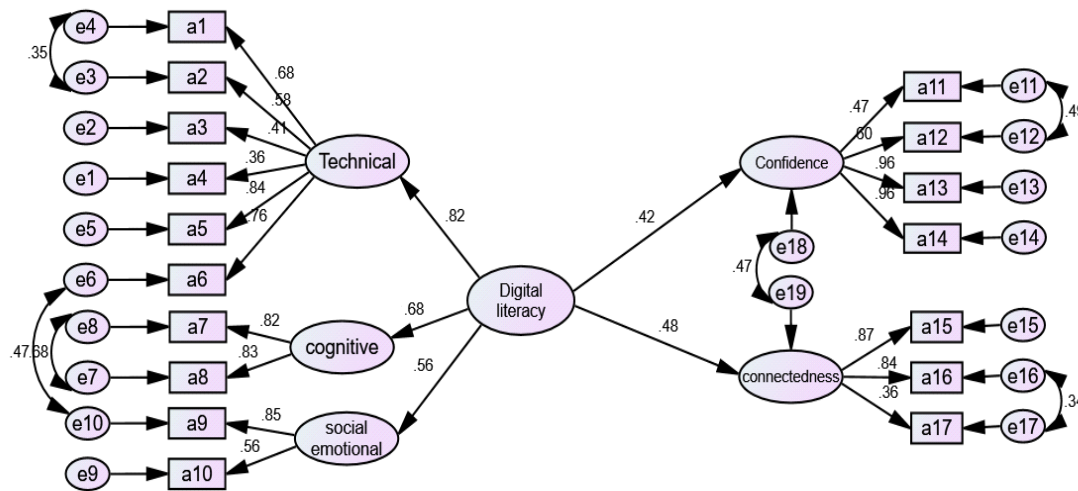


FIG. 2. The standard coefficients of the structural model of the relationship between digital literacy and online social capital.

Table 2. Fit indices of structure model of digital literacy and online social capital.

	X ²	df	X ² /df	GFI	AGFI	CFI	TLI	RMSEA
preliminary model	853.14	118	7.23	0.86	0.81	0.85	0.80	0.10
modified model	446.99	112	3.99	0.94	0.92	0.94	0.90	0.06

Note: AGFI, Adjusted Goodness of Fit Index; CFI, Comparative Fit Index; GFI, Goodness of Fit Index; RMSEA, root-mean square error of approximation; TLI, Tucker-Lewis Index.

The structural model's standard coefficients for the correlations between online social capital and digital literacy are displayed in Figure 1. Absolute values of factor loadings are more than 0.30. The standardized coefficient of digital literacy with the connectivity component of online social capital is 0.48, and with the confidence dimension of online social capital is 0.42, which is a high value, suggesting the significance of digital literacy in causing online social capital.

The structural model's overall fitting indices for the link between online social capital and digital literacy are displayed in Table 2. The basic model was fitted; however, results (Table 2) show that the fitting indices are not quite where they should be. Consequently, six paths of covariance between estimate errors were constructed utilizing the modification indices. The theoretical relationship between the covariate variables was also taken into account in order to perform these modifications. This was done in addition to considering the effect size of each modification on improving the model's fit. Measurement and theoretical model are consistent.

The modified model's fitting indices were $\chi^2/df = 3.99$, with a preferred value between 0 and 5; the GFI = 0.94; the adjusted GFI = 0.92; the TLI = 0.90; and the CFI = 0.94. All four index values above 0.9 are regarded as optimal. The RMSEA, considered an important fitness metric, was 0.06, and values under 0.08 have been considered appropriate.

Table 3. Pathway Coefficients and Factor Loadings

		b	S.E.	Standardized B	C.R.
Digital literacy	→ Technical	1.00		0.82	
	→ cognitive	2.13*	0.22	0.68	9.67
	→ social-emotional	1.22*	0.14	0.56	8.73
	→ confidence	0.56*	0.08	0.42	7.14
	→ connectedness	1.23*	0.16	0.48	7.83
technical	→ technical 4	1.00		0.36	
	→ technical 3	0.87*	0.12	0.41	7.60
	→ technical 2	0.99*	0.11	0.58	8.80
	→ technical 1	1.62*	0.18	0.68	9.24
	→ technical 5	2.15*	0.22	0.84	9.70
	→ technical 6	1.72*	0.18	0.76	9.49
cognitive	→ cognitive 8	1.00		0.83	
	→ cognitive 7	0.99*	0.02	0.82	47.29
social-emotional	→ social-emotional 10	1.00		0.57	
	→ social-emotional 9	1.57*	0.10	0.85	16.24
confidence	→ confidence 11	1.00*		0.47	
	→ confidence 12	1.36*	0.07	0.60	19.53
	→ confidence 13	2.21*	0.10	0.96	22.36
	→ confidence 14	2.09*	0.09	0.96	22.25
connectedness	→ connectedness 15	1.00		0.87	
	→ connectedness 16	0.99*	0.03	0.84	33.21
	→ connectedness 17	0.36*	0.03	0.36	10.76

*sig< 0.001

Table 3 shows standardized (B) and nonstandardized (b) path coefficients. Standardized coefficients of digital literacy with connectedness and confidence dimensions of online social capital are positive ($p < 0.01$). All factor loadings are significant and higher than 0.30 (factor loadings > 0.30 , $p < 0.01$).

Conclusion

The aim of this study was to examine the correlation between digital literacy and online social capital. The research findings indicate that there are significant positive relationships between digital literacy and online social capital, as evidenced by the correlation and pathway coefficients. As mentioned earlier in the introduction, the background review indicates that no empirical study has been conducted to examine the relationship between digital literacy and online social capital. Most of the current literature has mainly concentrated on elucidating the theoretical correlation between these concepts.

So, it could be concluded that people with high digital literacy have more online social capital. Digital literacy is a multidimensional construct. The technical dimension of digital literacy refers to the ability to use and navigate digital technologies effectively, while online social capital refers to the resources and benefits that individuals can access through their online social networks.

Technical digital literacy enables individuals to access and participate in online networks more effectively. People with higher levels of technical digital literacy are more likely to be active on social media platforms, online communities, and other digital spaces (Livingstone et al., 2020) where social capital can be developed. They can navigate these platforms, connect with others, and engage in meaningful interactions, thus expanding their online social networks. Technical digital literacy enhances individuals' ability to communicate and share information online. It allows them to effectively use various communication tools like email, instant

messaging, and video conferencing to connect with others. By being proficient in these tools, individuals can engage in frequent and meaningful communication, exchange knowledge and resources, and build stronger social ties, which contribute to the accumulation of online social capital (Ellison et al., 2014). Technical digital literacy enables individuals to actively participate in online collaborative activities, such as crowdsourcing, online volunteering, and collaborative problem-solving (Kim et al., 2015; Oh et al., 2021). By contributing their skills and knowledge to these activities, individuals can gain recognition, build social connections, and access valuable resources and opportunities. Technical digital literacy empowers individuals to engage in these activities effectively, thus enhancing their online social capital. Technical digital literacy can potentially empower individuals and promote social inclusion in the digital realm. It allows individuals to overcome barriers related to access, skills, and confidence in using digital technologies. By acquiring technical digital literacy, individuals can participate more fully in online social networks, connect with diverse individuals and communities, and access a broader range of resources and opportunities. This empowerment and social inclusion contribute to online social capital development (Cui et al., 2021). Recent research has shed light on the significant role played by the social-emotional dimension of digital literacy in fostering and enhancing online social capital. This dimension of digital literacy encompasses various emotional and interpersonal skills that individuals employ in their digital interactions, such as empathy and building and maintaining positive relationships online (Heidari et al., 2023; Ren et al., 2012; Williams, 2019).

This dimension of digital literacy plays a crucial role in managing one's online reputation and building trust within online communities. Digitally literate individuals are more likely to understand the importance of maintaining a positive online presence, protecting their privacy, and engaging in ethical online behaviors. By demonstrating their technical digital literacy skills, individuals can establish credibility and trustworthiness, which are essential for developing social capital online. The ability to empathize with others in digital interactions is a fundamental component of the social-emotional dimension of digital literacy. Empathetic individuals are better equipped to understand and respond to the emotions and needs of their online peers, which can lead to the establishment of trust and more robust social bonds (Drentea & Moren-Cross, 2005; Grondin et al., 2019).

A key aspect of the social-emotional dimension of digital literacy is the capacity to build and nurture positive online relationships. Recent research has shown that individuals who excel in this dimension are more likely to establish meaningful connections with others, leading to increased social capital (Milenkova & Lendzhova, 2021). Conflict is inherent in online interactions, and resolving conflicts constructively is vital for maintaining online social capital. Studies have demonstrated that individuals with strong social-emotional digital literacy skills are better equipped to manage conflicts, reducing the risk of negative outcomes and preserving social capital (Heidari et al., 2023; Ren et al., 2012; Williams, 2019). Online communities often serve as platforms for emotional support. Individuals who possess strong social-emotional digital literacy skills are more capable of providing and receiving emotional support within these communities, which contributes to members' overall well-being and strengthens social bonds (Chen et al., 2020; Worrall et al., 2021).

The study is limited to university students from Tabriz, which might not be representative of the general population or other educational levels. The findings may not be generalizable to older adults, individuals not enrolled in higher education, or to cultural contexts outside of Tabriz. Given the cross-sectional nature of the study, it is not possible to establish causality between digital literacy and online social capital. Longitudinal studies would be necessary to determine the direction of the relationship and how it evolves over time. The reliance on self-reported questionnaires for measuring digital literacy and online social capital can introduce response biases. Participants may overestimate their digital literacy or the quality of their online social interactions. The fast-paced evolution of digital technologies means that digital literacy and the nature of online social capital are also continually changing. The findings might soon become outdated or less relevant with the introduction of new digital platforms and communication tools. While confirmatory factor analysis supported the factorial structure of the instruments used, there is always a possibility that these questionnaires may not fully capture the multi-dimensional constructs of digital literacy and online social capital. Addressing

these limitations in future research could involve expanding the participant pool, employing a longitudinal design, using a multi-method approach to data collection to validate self-reported data, regularly updating the research framework to keep pace with technological advancements, and continuously refining measurement tools to stay aligned with the evolving constructs of digital literacy and social capital.

Ethical Considerations

All ethical considerations in terms of trust-building and respecting the privacy of participants have been observed.

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Conflict of Interest

The author has no conflict of interest.

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