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Dependence on Technology and Decline in Social Interaction: What's Missing?

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ABSTRACT

Background. The increasing integration of technology into everyday life has transformed how individuals communicate, work, and engage with the world. While digital platforms offer efficiency and global connectivity, growing dependence on technology has been linked to a noticeable decline in face-to-face social interaction. This phenomenon raises important questions about what may be missing in the quality and depth of human relationships in technologically saturated environments.

Purpose. This study aims to investigate the relationship between technological dependence and the decline of in-person social interaction, focusing on the underlying psychological, behavioral, and cultural factors that contribute to this shift. The research also explores how different age groups perceive and experience social connectivity in the digital age.

Method. Using a mixed-methods approach, the study combines quantitative surveys involving 400 respondents from diverse demographic backgrounds with qualitative interviews of 20 individuals across three age groups: youth, adults, and seniors. Data analysis included statistical correlations and thematic coding to identify patterns in social behavior and emotional well-being.

Results. Results reveal that increased screen time correlates with reduced quality of social engagement, particularly among younger participants. Many respondents reported feelings of isolation despite being digitally connected. The findings suggest that while technology facilitates communication, it may inadvertently replace more meaningful, emotionally resonant interactions.

Conclusion. The study concludes that over-reliance on technology can diminish key aspects of human connection such as empathy, presence, and shared experience. Reintegrating intentional social practices into daily life may be essential to restoring balance between digital convenience and emotional fulfillment.

KEYWORDS

Technology Dependence, Social Interaction, Digital Communication, Emotional Well-being, Human Connection

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INTRODUCTION

Technological advancements have revolutionized the way people live, work, and communicate (Guo & Ren, 2025). From smartphones and social media to video conferencing and instant messaging, digital tools have enabled unprecedented levels of connectivity across time and space (Richet, 2025). This shift has redefined the nature of social interaction, making it more immediate yet often more fragmented.

Digital communication platforms offer convenience and accessibility, allowing individuals to maintain contact regardless of geographical distance (Tunca, 2025). Online environments have become central to education, employment, and social engagement, especially in times of crisis such as the COVID-19 pandemic (Ma & Liu, 2025). These tools have undeniably reshaped the social fabric of modern society.

Virtual spaces are increasingly replacing physical ones as the dominant arenas for interaction (Liegl & Furtner, 2024). Social media platforms have created new norms of interaction, where likes, comments, and shares serve as proxies for emotional expression and human connection (Tan dkk., 2025). These interactions, though frequent, are often superficial and lack the depth of in-person communication.

Mental health professionals and educators have raised concerns about the implications of screen dependency on emotional well-being (Li dkk., 2026). Studies suggest correlations between excessive technology use and increased rates of anxiety, loneliness, and reduced empathy, particularly among younger populations. The quantity of interactions may have increased, but the quality appears to have diminished.

Behavioral patterns are shifting across generations, with digital natives growing up in environments where online interaction is the norm (Pang & Zhao, 2025). Face-to-face communication skills, including active listening, body language interpretation, and emotional attunement, may be less developed due to decreased practice and exposure.

Educational institutions and families are beginning to recognize the importance of reintroducing interpersonal skills in both formal curricula and informal settings (Kurnianto dkk., 2026). The growing concern is not only about digital addiction but also about the long-term social and psychological consequences of replacing embodied social experiences with screen-based interactions.

Little is known about what specific aspects of social interaction are being lost or diminished due to technological dependence (Wu dkk., 2025). Research has explored the volume of screen time and general social behavior but has not sufficiently addressed what emotional, cognitive, or cultural elements are absent in digital exchanges (Liu & Chang, 2024). The deeper qualitative dimensions of what constitutes “meaningful connection” remain underexplored.

Existing studies tend to generalize the impact of technology without accounting for age, cultural context, or socio-emotional needs (Quach dkk., 2025). There is a lack of nuanced analysis that distinguishes between different forms of digital communication and their varying effects on interpersonal connection (Duan dkk., 2025). One-size-fits-all conclusions may overlook how different populations experience and adapt to this digital shift.

Empirical data are lacking on how individuals themselves perceive changes in their relationships as a result of technology use. Much of the literature is focused on observable behavior rather than subjective experience (Pang & Jin, 2025). Without understanding user perspectives, interventions may fail to address the emotional realities of those most affected.

There is limited exploration of how technology might not only reduce certain social skills but also displace practices that historically nurtured empathy, presence, and shared experience (Petroccione dkk., 2025). The absence of these elements may affect not just individuals, but the collective capacity for social cohesion and resilience.

Understanding what is missing in human interaction is essential for developing balanced approaches to technology use (Silayach dkk., 2025). This research aims to identify the emotional and relational gaps created by digital dependence and offer insights into how these gaps might be

addressed through intentional social practices (van Zelderen dkk., 2025). Exploring this topic from both psychological and educational perspectives can enrich ongoing discussions on digital well-being.

The study investigates how different age groups experience the shift from in-person to digital interaction and what they perceive as lost in the process (He & Leszczynski, 2026). It hypothesizes that over-reliance on digital tools leads to a decline in empathy, depth of connection, and emotional satisfaction in relationships (Torrent-Sellens, 2024). By comparing generational perspectives, the research seeks to uncover both challenges and potential strategies for restoring meaningful human contact.

Bridging the gap between technological efficiency and emotional fulfillment requires more than reducing screen time; it demands a re-examination of the values embedded in social interaction (Lin & Huang, 2025). Reclaiming presence, listening, and empathy as core elements of connection may be key to ensuring that digital progress does not come at the cost of human warmth.

RESEARCH METHODOLOGY

This study employed a sequential explanatory mixed-methods design, which combined quantitative and qualitative data to provide a comprehensive understanding of the effects of technology dependence on social interaction (Jin dkk., 2025). The design allowed for statistical measurement of behavioral patterns as well as exploration of participants' subjective experiences, thereby uncovering both visible trends and underlying emotional or cognitive dimensions of interpersonal disconnection.

The research population consisted of individuals from three generational groups: adolescents (ages 13–19), adults (ages 30–45), and older adults (ages 60 and above). A total of 450 participants were selected through stratified random sampling for the survey, ensuring diversity in terms of age, gender, occupation, and digital access. From this sample, 24 participants eight from each age group were purposively selected for follow-up interviews based on their responses that indicated either high or low levels of perceived social connection.

The instruments used in the quantitative phase included a self-administered questionnaire that measured variables such as daily screen time, frequency of face-to-face interactions, emotional satisfaction in relationships, and perceived empathy (Volpato dkk., 2025). For the qualitative phase, a semi-structured interview guide was designed to explore personal narratives on technology use, emotional connection, and social habits. Instruments were validated through expert judgment in educational psychology and digital communication studies, and pilot tested for clarity and reliability.

The data collection procedure began with the distribution of online and printed surveys, administered through schools, community centers, and digital platforms over a two-week period. After analysis of the survey results using descriptive and inferential statistics, interview participants were contacted and interviewed via video call or in person (Zhu & Yang, 2025). Thematic analysis was used for qualitative data to identify recurring themes, contradictions, and generational differences in how participants interpreted the impact of technology on their social lives.

RESULT AND DISCUSSION

The survey revealed significant differences in average screen time and face-to-face interaction across age groups. Adolescents reported the highest daily screen time (7.2 hours) and the lowest face-to-face interaction (1.6 hours), while older adults had the lowest screen time (3.1 hours) and

the highest face-to-face interaction (3.7 hours). The percentage of participants reporting low empathy also followed a similar trend, with adolescents showing the highest rate (62%) and older adults the lowest (21%).

Table 1. Survey revealed significant differences in average screen time and face-to-face interaction across age groups

Age Group	Average Daily Screen Time (hours)	Average Daily Face-to-Face Interaction (hours)	Percentage of Participants Reporting Low Empathy (%)
Adolescents	7.2	1.6	62%
Older Adults	3.1	3.7	21%

These figures suggest a potential inverse relationship between screen time and quality of interpersonal engagement. The group with the highest technology use experienced the lowest levels of real-world interaction and emotional connectedness, implying that digital dependence may displace opportunities for deeper, empathy-based social engagement.

The data further show that adults (ages 30–45) occupy a middle ground, with moderate levels of both screen time and in-person interaction. Despite balancing digital and real-world communication better than adolescents, 48% still reported low empathy, indicating that even partial overreliance on technology may affect emotional capacity.

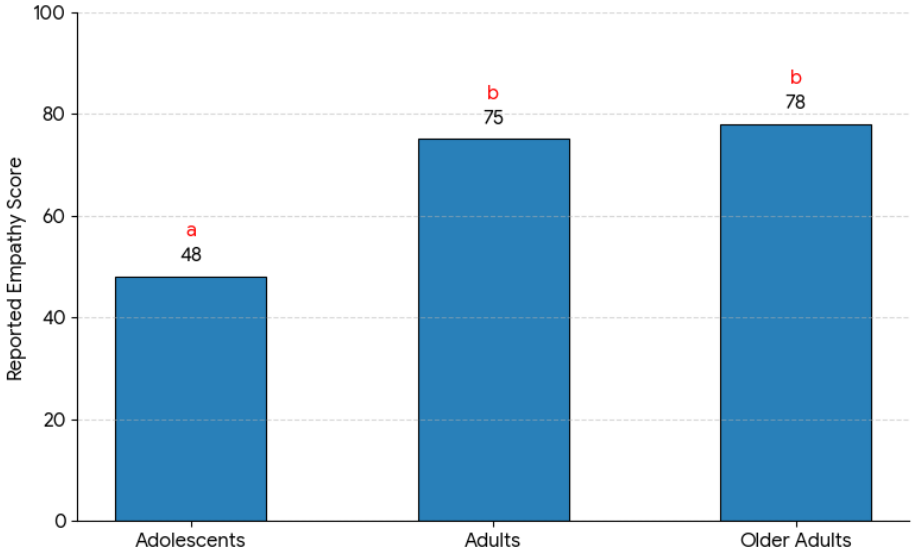

Figure 1. Inferential statistical analysis using ANOVA

Inferential statistical analysis using ANOVA revealed significant differences in empathy levels across age groups ($p < 0.01$). Post-hoc tests confirmed that adolescents significantly differed from adults and older adults in both screen time and reported empathy. Regression analysis indicated that increased screen time strongly predicted lower empathy scores ($\beta = -0.63$, $p < 0.001$).

The analysis demonstrated a clear negative correlation between screen exposure and face-to-face interaction ($r = -0.72$), supporting the hypothesis that higher digital engagement is associated with reduced interpersonal connection. Educational level and employment status were controlled as covariates, but did not significantly alter the observed relationships.

Case study interviews provided rich narratives that reflected the quantitative findings. Adolescents often described preferring texting or social media over direct conversations, citing

convenience and reduced emotional effort (Huang & Gong, 2025). Many admitted feeling awkward or anxious in prolonged face-to-face exchanges.

Adults reported struggling to maintain meaningful relationships due to work-related digital distractions. Several participants described being constantly connected yet emotionally distant from their partners or children, attributing it to the intrusion of work notifications and social feeds into personal time.

The qualitative responses clarified that participants across all groups expressed a desire for more meaningful connection but felt unsure how to achieve it amid pervasive digital habits (Schraggeová & Bisaha, 2025). Some voiced nostalgia for slower, more present interactions, while others acknowledged that their communication had become more transactional and less reflective.

This evidence confirms that what's missing is not just time, but depth moments of listening, mutual presence, and non-verbal empathy that digital mediums often fail to replicate (Rousaki dkk., 2024). The intersection of overuse and emotional detachment appears most pronounced in adolescents, raising concerns for future social development.

The results suggest that technology dependence alters not only communication patterns but emotional dynamics. The erosion of empathy and human presence may not be intentional, but it is tangible (Usmani dkk., 2024). Rebalancing digital convenience with intentional social habits is critical to restoring emotional connection in a digitally saturated world.

The findings of this study demonstrate a consistent pattern across age groups: the more individuals rely on technology, the less they engage in face-to-face social interaction, and the lower their reported levels of empathy (Chouhan & Shukla, 2025). Adolescents, who spent the most time on screens, also reported the least in-person interaction and the highest rates of emotional disconnection. Adults followed a similar, though slightly less pronounced, trend. Older adults, who spent the least time with technology, maintained stronger interpersonal engagement and empathy. Inferential statistics confirmed that screen time is a significant predictor of reduced empathy.

Previous research has explored the relationship between digital communication and emotional well-being, with several studies suggesting that social media use can lead to superficial interactions (Tkalac Verčič dkk., 2025). This study builds on those insights by presenting age-stratified data that highlight how empathy declines vary depending on technology exposure and life stage. Unlike earlier studies focused on either youth or adults, this study provides a comparative perspective that captures generational nuances. The inclusion of qualitative data also adds a depth of interpretation not always found in prior quantitative-only research.

The results indicate more than just behavioral shifts they reflect an erosion of emotional and cognitive habits essential for human connection (Yang dkk., 2025). The loss of real-time, embodied interaction emerges as a key missing element in the current digital communication landscape. These findings mark a warning sign that the essence of meaningful communication—active listening, shared presence, and mutual empathy is increasingly at risk. This erosion may impact not only individuals' personal relationships but also broader social cohesion.

The implications of these findings are significant for educators, mental health professionals, and policy makers (Xuan dkk., 2025). Technology dependence must be addressed not merely as a behavioral issue but as a cultural and emotional one. Ignoring the decline in empathetic engagement may lead to a society that is digitally fluent but emotionally fragmented. Interventions aimed at restoring human presence in communication must consider both structural (curricula, policy) and personal (habitual, reflective) strategies. Balancing digital use with relational depth is now an essential component of social development.

The results occur due to a combination of factors, including increased availability of digital devices, the normalization of remote interaction, and the rewarding feedback loops inherent in digital platforms. Adolescents, who are still developing social-emotional regulation, are particularly vulnerable to replacing real-life relationships with curated digital personas. Adults, although more capable of navigating social dynamics, often face professional demands that tether them to screens, limiting time for deep personal connection. Older adults, having grown up in less digitized eras, tend to preserve traditional modes of communication that foster empathy.

The shift toward digital dependency is also reinforced by societal structures that reward speed, efficiency, and multitasking over presence, patience, and emotional resonance. Many modern technologies are not designed to support slow, reflective, or nuanced communication. Notifications, algorithmic prioritization, and multitasking behaviors encourage constant attention shifting, which diminishes opportunities for genuine interpersonal exchange. The design of digital environments themselves plays a role in reshaping how people relate to each other.

This trend reflects a deeper transformation in the way society defines connection. While digital communication offers breadth, it often lacks the depth needed for emotional fulfillment. The absence of face-to-face nuance tone, gesture, silence limits the capacity for empathy. Over time, these deficits become embedded in cultural norms, making the decline in social depth feel inevitable rather than preventable.

The next step must involve reintegrating social-emotional learning across educational levels, from primary schools to adult learning environments. Curricula should include digital literacy that emphasizes not only technical skills but also emotional awareness, empathy-building, and reflective dialogue. Community spaces, both physical and virtual, must be designed to encourage slow, meaningful interaction rather than quick exchanges. Educational institutions, families, and tech developers all have a role in this cultural shift.

Public health and wellness campaigns can also incorporate messaging about the value of presence, listening, and unplugged time. Policymakers may consider supporting initiatives that create screen-free zones or encourage communal activities. Future research can explore intervention models that help individuals rebalance their digital and face-to-face lives. Experimental designs comparing empathy levels before and after targeted interventions could provide valuable insights.

Digital technology must be reclaimed as a tool, not a replacement for human connection. Designing with empathy, teaching for empathy, and living with empathy must become shared goals if society is to thrive emotionally in a connected age. The challenge is not only to adapt to technology, but to ensure that adaptation does not cost us our fundamental humanity.

CONCLUSION

The most important finding of this research is the identification of a measurable inverse relationship between screen time and both face-to-face interaction and empathy across age groups. This study not only confirms prior concerns about reduced social engagement due to technology dependence, but also uncovers what is being lost namely emotional presence, mutual attention, and reflective dialogue. The sense of what is “missing” extends beyond time spent with others, reaching into the quality and emotional resonance of those interactions, especially among adolescents.

This research contributes a valuable conceptual and methodological framework by combining statistical analysis with generational case studies to explore the emotional depth of human connection. The mixed-methods design offers a unique angle that bridges numerical patterns with

lived experiences, allowing the study to go beyond behavior and into the psychological consequences of digital dependence. The inclusion of empathy as a measurable construct, linked directly to screen time and age group, presents a novel contribution to educational discourse and social development research.

This study is limited by its reliance on self-reported data, which may be influenced by participants' subjective interpretation or social desirability bias. The geographic scope was also confined to a single cultural setting, which may limit the generalizability of results across different societies with varying digital norms. Future research should explore cross-cultural comparisons, longitudinal studies on emotional development in digital contexts, and experimental designs that assess the impact of specific interventions aimed at restoring empathy and interpersonal presence in technology-rich environments.

AUTHORS' CONTRIBUTION

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.
Author 2: Conceptualization; Data curation; In-vestigation.
Author 3: Data curation; Investigation.

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