

Empathy in the digital age: Navigating virtual connections and maintaining human connection

Amit Kansal^a | Karan Pandre^b | Nipun Sharma^c | Badri Narayan Sahu^d | Solomon Jebaraj^e | D. Velumoni^f | Vivek Kumar Sinha^g

^aQuantum University Research Center, Quantum University, Roorkee, Uttarakhand, India.

^bCentre for Multidisciplinary Research, Anurag University, Hyderabad, Telangana, India.

^cDepartment of Electronics and Communication, Presidency University, Bengaluru, Karnataka, India.

^dDepartment of Electronics & Communication Engineering, Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar, Odisha, India.

^eDepartment of Computer Science and Information Technology, JAIN (Deemed-to-be University), Bangalore, Karnataka, India.

^fMaster Of Business Administration, Sathyabama Institute of Science and Technology, Chennai, Tamil Nadu, India.

^gDepartment of Computer Science & Engineering, Noida International University, Greater Noida, Uttar Pradesh, India.

Abstract The digital age has a significant impact on the nature of human communication, contributing to a shift away from the immediacy of face-to-face interpersonal interaction toward human-machine interaction. The research employs a contemporary engineering framework for investigating the influence of technology use on family communication while carefully attending to the ideals that must support humanity against what is a rising tide of technology. The researchers selected family units inhabiting distinct local council development zones. It utilized a literature-based research approach to investigate how digital interactions impact emotional connection and communication patterns with family situations. The research aimed to examine family experiences with digital technology, perspectives on interpersonal communication, and perceived changes in relationship dynamics. By employing appropriate statistical strategies to derive useful data, the research noted a decrease in family members' interest in face-to-face interpersonal communication in conjunction with an increase in the family's use of technology. The data also suggested that information that was absent or limited self-disclosure and limited signalling typically leads to family members more likely drifting away from each other instead of coming together. Consequently, the research revealed that fostering and nurturing successful family relationships is more complex than simply learning skillsets, tools, and engineering technology related to digital devices. The research promotes frequent connection with communication technologies by outlining core criteria while keeping the essential features that characterize humanity. Despite developments in digital communication tools, the research emphasizes the significance of developing meaningful human relationships with families, particularly in the environment of the digital engineering systems.

Keywords: computational empathy, digital communication behavior, technology-mediated interaction, family digital dynamics, affective computing, extended reality (XR)

1. Introduction

Every day, life, interactions with others, how people go about people's jobs, and how people unwind are influenced by electronic devices (Sutton, 2020). However, an overall pattern of anti-tech language has stoked concerns about the risks of excessive internet usage and dependence and implies that technology is addictive, inappropriate, or detrimental. According to how it subverts societal norms, electronic equipment has the potential to become socially damaging. The latest technological advances were seen under a variety of national optics, intersecting and frequently clashing with their sense of how to live correctly. Therefore, it depends on where and to whom virtual detoxers exist. The realms of society, politics, and the economy of existence have all been profoundly impacted by digital connective technologies in the twenty-first century (Saykili, 2019). These modern techniques have caused significant shifts in how individuals engage with material, connect with their peers, and operate in the community (Wiederhold et al., 2019). The ability to stay in touch with people who live in different regions of a single nation, or perhaps the entire globe from a broader perspective, as well as the creative methods to share, interact, and connect with the data others have offered through new media, has further increased the pressure on governments to follow appropriate processes. It affects the creation of group projects for online learners (Ye et al., 2021).

Parental usage of smartphones has been linked with different behavior issues in children, including impatience or disengagement. Behavioral problems arise in children when parents are constantly distracted by their electronic devices. Children feel emotionally unregulated and neglected when family contexts are technology-based. These dynamics impact their subjective well-being and social development (Braune-Krickau et al., 2021). Parent-child techniques degrade the quality of interactions during daily activities. Children who are frequently exposed to technology form stronger attachments to digital

devices. Negative parenting approaches exacerbate the development of problematic phone use in children. Gender variations also influence how these disturbances impact behavior (Shao et al., 2024).

Parental phubbing, which involves ignoring a child in the interest of smartphone use, has emotional implications. This conduct has been linked to increased depression symptoms in adolescents. Phubbing creates an emotional divide that hinders trust and communication. Mental health issues arise from persistent neglect (Zhou et al., 2024). Digital media distraction by parents affects the daily routines and habits of young children. Phubbing and inconsistent coparenting increase preschoolers' exposure to screens. Less social engagement and more passive behavior could be the outcome of such dynamics. The way parents handle digital distractions affects how well their families are connected.

Parental depression is associated with lower emotional availability and caring. As a result, parents engage in inattentive parenting, which affects their children's ability to regulate emotions. Children with low self-esteem are more at risk of developing device addiction. The nature of parent-child relationships acts as a predictor of digital behaviors (Mun & Lee, 2023). Parental phubbing affects teenagers' mental health through the use of indirect ways of attending to emotional cues. Low self-esteem amplifies the emotional consequences of caregivers ignoring them and intensifies the symptoms of depression when teens perceive low social support (Wang et al., 2020).

Consequently, knowledge of technology plays a significant role in assisting students in developing more online learning techniques (Tran, 2020). The sudden shift to distance learning amid the COVID-19 outbreak necessitates additional efforts by authorities to guarantee high standards of instruction and inclusivity and to establish a secure learning environment to help each student fulfil the SDG4 goal. To stay up to date with the latest advancements, the Republic of Vietnam's Minister of Instruction and Training should closely cooperate with experts in the sectors of education and the internet to update the material on the topic on a regular basis given the effective execution of an entirely novel curriculum, which makes the IT subject a required one (Zych et al., 2019). Additionally, it ensures that students have the understanding and capacity to use the internet to help them grow while safeguarding them from rising online threats. Structures are now expected to respond to shifting socioenvironmental factors, which have expanded construction intricacy in the last few decades (Rao, 2023).

Given the boundless conversion of physical environments into digital environments, people argue that spaces need to accommodate the whole range of individual desires and perspectives (xie & xie, 2020). Operational psychologists are skeptical of compassion since it is frequently equated with sentiment (Ranchordas, 2021). However, since passionate disagreements primarily emphasize one side, people find it more difficult to comprehend an individual's stance fully. The digital administrative state needs more perspectives on the past and more consideration of specific facts. Instead of making abstract, purely legalistic claims to legal concepts, compassion in law involves interactions between people, humanitarian evaluations, and actual tales from people. It could be a reaction to the myopia of massive datasets containing enormous quantities and the opacity of automated processes in a society that are becoming increasingly automated and computerized.

The objective of this research is to investigate the impact of the regular use of digital devices on other family members' one-on-one contact patterns. Specifically, the research seeks to identify the impact of technology use on interpersonal communication within families and explore factors such as disinterest, lack of self-disclosure, and limited cues that contribute to the change. This research aims to provide critical guidelines for maintaining strong family ties beyond the acquisition of digital skills, tools, and technology.

The remaining portions of the research are as follows: Section 1 contains the introduction of the research, and Section 2 contains the methodology of the research. Section 3 discusses the outcomes of the research. Section 4 concludes the research with important findings and their consequences.

2. Research Methods

The review used a literature-based research approach to investigate how empathy is formed and communicated in the context of digital communication. The goal was to compile existing research on digital technology use and its effects on emotional connection and interpersonal interactions, particularly with respect to families and social groupings. The articles were chosen for their relevance to virtual communication, digital empathy, and social media practices. Studies utilizing modern messaging systems, online mental health networks, and virtual interaction frameworks have received special attention. This review sought to comprehensively investigate how changing digital environments influence the depth and quality of human connections in the digital age by assessing observable patterns across numerous studies.

2.1. Conceptual empathy models

Understanding empathy from a conceptual perspective is critical for investigating how it manifests in digital interactions. This section describes the fundamental features of empathy and introduces recognized theoretical models, particularly those employed in computational contexts. These concepts work together to describe how empathy acts psychologically and technologically in digital environments.

2.1.1. Empathy dimensions: Cognitive, affective, and compassionate

Empathy is a multidimensional social skill that enables individuals to understand and connect with others. It is commonly classified into three interrelated components. Cognitive empathy is the intellectual ability to understand where another person is coming from, or their perspective. Cognitive empathy is related to the notion of perspective taking, and the terms are often used synonymously (Stevens et al., 2021). Affective empathy, or emotional empathy, goes one step further and means having the ability to feel what others feel. In complex situations, feeling quickly without thinking is an important ability that is related to the evolution of humans. Compassionate empathy, or empathetic care, means being able to see what another person needs from people in a way that allows them to respond. The element of empathy goes further than perspectives and feelings sharing, a component showing constructive behaviors that include information about others and allow for problem solving (Thompson et al.,2022). Table 1 presents the dimensions of empathy in digital communication.

Table 1 Dimensions of empathy in digital communication.

Empathy Type	Definition	Example in Digital Context
Cognitive Empathy	Understanding someone else's opinions, perspectives, or points of view. Recognizes what others could be thinking or feeling.	Reading a friend's lengthy post and understanding their emotional state. Responding by acknowledging their circumstance.
Compassionate Empathy	Moving beyond comprehension to take action to aid. Integrates cognition, emotion, and supportive behavior.	Joining an online support group to share tips. Providing links or resources to assist someone in trouble.
Affective Empathy	Sharing or experiencing other people's feelings intuitively or emotionally. Includes emotional resonance and connection.	Feeling sorrow after watching a grief-related video post. Expressing similar emotions through supportive comments.

2.1.2. De Waal's Russian-doll model and computational frameworks

There are multiple ways in which computational empathy is defined through computational methods, resulting in different notions of empathy. There is some consensus in the literature that people now have some form of empathy framework; the foundational models and frameworks for common-sense computational empathy are built on De Waal's Russian doll model of empathy (Salazar Kämpf et al., 2023). It defines empathy as the shared feelings between two persons in which one of these subjects feels the same feeling as the empathic person. When one person senses another person's emotional state, their representations are activated in ways that are environmental-causal and not agentic. An affective matching component of empathy is represented by the imitative form in the model's lowest layer. The second layer is consolation, which is symbolized by caring attention. Finally, the third layer is demonstrated by perspective-taking and particular attention. (Raamkumar & Yang, 2022).This approach is also increasingly being investigated in engineering fields, including digital systems. Its layered structure serves as a foundation for developing engineering tools and platforms that imitate empathic responses in virtual environments, especially in affective computing and human-centered engineering design.

2.2. Role of empathy in digital technology and online empathy in mental health communities

The distinction between in-person and virtual human interactions is blurring; the idea of empathy needs to be extended to encompass digital settings. Currently, virtual empathy is also known as digital empathy, which is sometimes used interchangeably with digital empathy, which is frequently referred to as digital core competency (Duarte et al., 2023). Riva et al. (2019) mention that these terms are synonymous but differ in their distinctions. Digital empathy encompasses a wide range of digital communication channels, including emails, social media, chat apps, online forums, and other online interactions. It includes interpreting feelings and emotions expressed by using words, images, emoticons, GIFs, and videos. Virtual empathy is used to interpret and understand emotions through avatars and connections with each other in 3D virtual environments, where the user can embody the role of another character and perhaps actually experience emotions and feelings differently. Consequently, these authors could view virtual empathy as a variety of digital empathy. Jiang and Gao (2020) defined digital empathy as the mental and emotional capacity to use digital media strategically while being thoughtful and socially conscious.Both digital empathy and virtual empathy are capable of identifying and responding to emotions in digital settings, whereas virtual empathy is a more particular word that refers to digital experiences in spatially mediated virtual environments. Nevertheless, both types of empathy are essential for relationship building and comprehension in an increasingly digital world (engineering) (pawiak, 2024).These improvements have obvious implications for emotional engineering design, particularly in systems that combine human interaction with emotional reactions through engineering-based digital platforms.

Users who provide social support or comments in online mental health communities (OMHCs) often exhibit empathy by understanding and responding to the emotional needs of others. It is a complex term with cognitive and emotive components. In mental health counselling, empathy is regarded as an important marker of effective intervention that leads to more positive outcomes (Cánovas et al., 2018), where empathy is observed as the ability to recognize the client's feelings, validate that understanding, communicate that understanding and engage in some helpful potential action on the basis of that



understanding. Research has shown that empathy reinforces intergroup relationships and reduces discrimination and prejudice against minority groups. Empathy exists both in face-to-face interactions and in mediated interactions, such as through online technologies (Marín-López et al., 2019). Engineering frameworks for these technologies must accommodate the complexities of emotional expression. Empathy was demonstrated in one online group of older persons, and a coding scheme was developed to assess online empathy. Sharma et al. (2020) developed an empathy model that aligns with text-based, asynchronous peer-led support interactions. The model has three dimensions (meaning, reactions, and explorations) and three levels (weak communication within the category, no communication within the category and strong communication within the category) (Chen et al., 2021). Research has demonstrated that empathy is connected with positive results in OMHCs. Empathy was also discovered to be positively connected with people's willingness to help other people, which is important for the establishment of online communities. It was expected that additional posters would join the commentators following the helpful interactions. Considering the possible implications of online empathy in OMHCs, the means of assessing empathy were studied, and some recommendations for increasing empathy in response were presented (Sanjeewa et al., 2024). These discoveries are increasingly influencing engineering approaches to digital communication design, particularly in the development of emotionally intelligent systems and engineering solutions for virtual mental health environments.

2.3. Empathy: Face-to-face vs. online interactions

As digital communication increasingly replaces traditional in-person contact, it is critical to examine how empathy is exhibited in both settings. This section investigates the developmental basis of empathy and how digital platforms can both increase and decrease empathic capacity. The emotional differences between virtual and in-person contact are highlighted.

2.3.1. Foundations of cognitive and affective empathy in human development

Females frequently show higher emotional intelligence (EI) and empathy than males, although some studies report no significant differences based on gender or age. Empathy is typically divided into three components: cognitive empathy, empathy concern and affective empathy. Affective empathy can be observed developing in childhood. Affective empathy functions through mirroring and emotional matching in children interacting with social agents in their environment (Pittelkow et al., 2021). Later in life, children learn to consider things from the point of view of others; the capacity is crucial for developing mature sympathetic responses. Mature sympathetic responses involve self-awareness and cognitive perspective-taking processes. Empathic responses generally include both cognitive and affective empathy (Farrington & Llorent, 2019).

2.3.2. Digital impacts: Virtual empathy and online desensitization

Empathy plays a crucial role in online behavior. Face-to-face empathy is reduced by online interactions, and face-to-face conversation time is also decreased. This finding suggested that the reason why face-to-face empathy is diminished in online encounters is that people do not use nonverbal communication cues, which are essential for experiencing and perceiving emotions. These signals include body language, facial expressions, and even eye contact. However, people have posited that the capacity for virtual empathy is possible through online contact and that communicating online does not appear to diminish people's empathy in a face-to-face context. Research has shown that being in cyberspace while engaging in activities that lead to the possibility of face-to-face interactions actually contributes to an increase in face-to-face empathy residue (Walker & Venker Weidenbenner, 2019). The results also revealed that emotional empathy scores were lower than cognitive empathy scores. Marín-López et al. (2019) established some empirical evidence of online empathy and validated a measurement tool that was used. Moreover, it still suggests that, to a degree, communicating with people with electronic engineering devices helps or even increases empathy. For example, it is possible to identify and reach people who are also in similar or the same life situations as the person, which people know is particularly reassuring when approaching a topic that is difficult to navigate face-to-face. Conversely, some research indicates that playing violent video games increases the likelihood of aggressive behaviors and decreases engineering empathy and prosocial behavior. In simple terms, it seems that online interpersonal interactions exhibit empathy. Certain online activities elicit sympathetic reactions in both virtual and in-person interactions. In contrast, technology has the capacity to decrease empathy by potentially reducing engineering empathy where face-to-face interactions occur (Grondin et al., 2019). Table 2 shows the comparison of face-to-face and online empathy.

Table 2 Comparison of face-to-face and online empathy.

Criteria	Face-to-Face Interaction	Online Interaction
Nonverbal Cues	Includes tone, eye contact, gestures, and facial expressions. Offers contextual clarity and emotional depth.	Mostly absent; users rely on emojis or typed language. Limited cues increase the chance of misinterpretation.
Depth of Emotional Expression	Emotion is expressed through tone, tears, laughter, etc. It leads to deeper emotional bonding.	Emotions are conveyed through punctuation, emojis, and words. Depends on user skill and platform limitations.



Criteria	Face-to-Face Interaction	Online Interaction
Risk of Miscommunication	Lower risk due to immediate clarification cues. Misunderstandings resolved quickly.	Higher risk due to missing tone/body language. Text misread or interpreted differently.
Empathy Type Prevalent	Cognitive and affective empathy usually co-occur. Users connect more naturally through interaction.	Mostly cognitive empathy; emotional responses are less instinctive. Could still enable strong connections in supportive settings.
Opportunity for Support	Spontaneous, context-driven support from close contacts. Direct engagement helps with emotional relief.	Support could be scheduled or anonymous. Asynchronous nature increase accessibility.

2.4. Impact of digital technology on communication dynamics

Digital technology has changed communication, allowing instant worldwide interaction while simultaneously testing the depth and quality of interpersonal relationships. While speed and reach have increased connectivity, preserving emotional depth in digital interactions necessitates conscious design and thoughtful conduct, as shown by recent research.

2.4.1. Communication behavior and social connection

Digital technology has changed communication practices and patterns in both social and commercial domains and has developed the behaviors of individuals. More recently, changes have been a faster and more accessible manner of communicating as a result of instant messaging services, video conversations, and social networking sites. Individuals now communicate with people around the world in 'real' time and have face-to-face contacts packaged into virtual communication. The improvement has created some pluses, as well as minuses; for instance, it enables global connection and culture exchange, yet it also enables shallow relationships with limited depth in comparison to when interaction is inperson (Shamsie, 2024). One of the most significant shifts in communication habits brought about by digital technology is the phenomenon of "continuous partial attention," in which people divide their focus among many communication channels at the same time. For example, people frequently juggle text message discussions, social media surfing, and email checking. Multitasking limits the quality of attention given to each contact, decreasing communication depth and the ability to create strong bonds. Such actions lead to miscommunication and lower empathy in digital exchanges, necessitating the establishment of standards and etiquette for efficient communication. Social media has a considerable effect on relationships by providing platforms for connection and self-expression. Platforms such as Instagram, Facebook and X (previously Twitter) allow users to maintain relationships with friends, family, and coworkers while also growing their networks with new contacts. Social media has become an essential component of how individuals interact with one another by allowing them to share personal updates, images, and opinions. However, these digital connections are frequently regulated, providing an idealized vision of life that might cause comparison, envy, and low self-esteem. In relationships, social media has changed how partners connect and create intimacy (Abou Hashish, 2025). The capacity to interact quickly and share experiences in real time enhances friendships, but a loss of privacy and continual connectedness also cause stress. Issues such as online jealousy, the visibility of former relationships, and the urge to seek affirmation from others are becoming more common in the digital age. Effective communication and mutual trust are critical for negotiating these problems in digital situations.

2.4.2. Digital communication and mental well-being

Digital technology has also altered the way people establish and maintain professional relationships. People use online networking services such as LinkedIn to show their expertise and connect to unknown employers, clients, and future roles that would have never been available to them previously. Digital communication eliminates many of the barriers from the way people communicate with each other, making it easier to network and connect; however, it also increases the challenges to communication at work or elsewhere when messages are misconstrued, nonverbal signals are in most cases absent, influenced by the sheer distance from the virtual network, and creates feelings of loneliness for individuals working remotely. Striking an ideal balance between face-to-face and digital contact is necessary in developing strong professional relationships in a digital world where communication has many benefits, even with downsides, such as damage to mental health or relationship satisfaction. Because connections made digitally lack the same rich emotional experience" of personal conversations, people foster the separation that seeks to dissolve loneliness and social isolation. A careful approach to thinking about technology with an emphasis on meaningful connections over quantity helps manage the risks of making connections virtually as well as maintaining connections over time in meaningful relationships (Lee et al., 2023).

2.4.3. Empathic communication practices on social media

As people shift toward a digital world, social media has emerged as a primary site of emotional expression without evidence or signals necessary for empathy too often. It investigates how digital platforms can both uniquely inhibit and motivate empathic communication to justify the role of developing empathy on digital platforms.

➤ *Techniques and strategies for digital empathy*

However, social media conversations often involve ambiguous words and little emotion, leading to misunderstandings and conflict. To counteract these challenges, it must engage in empathic communication. Empathic communication means understanding and experiencing the other's perspectives complemented with genuine care and understanding. Active listening is a process of engaging in sympathetic communication on social media. The process requires listeners to understand what others have said before responding to them. Social media involves reading a post or a comment thoughtfully and thoroughly to understand the content fully and then responding (Suliantoro & Syakhrani, 2025). Understanding the context and feelings behind the message allows the prevention of spontaneous replies that are cruel or insensitive. Furthermore, utilizing polite and respectful language is essential for effective empathetic communication. Everyone should constantly respect the other person's feelings when conveying messages. Using polite words, avoiding insults, and demonstrating respect in all interactions help other people feel appreciated and understood. An emphasis on emoticons or emojis can also be used to express emotional nuances that could be missed in written communication, clarifying intentions and thoughts (Marwick & Boyd, 2019).

➤ *Building a community through supportive online responses*

Empathy is demonstrated by offering emotional support. On social media, people are frequently exposed to heartfelt personal experiences or emotions of disappointment and despair. Small activities such as this significantly improve social relationships on digital websites. Finally, it is critical to recognize mistakes and apologize if people have inadvertently damaged someone else's sentiments on social media (Johnson, 2022). A genuine acknowledgement and apology demonstrate empathy and a willingness to accept responsibility for the actions. It also contributes to a more inclusive and understandable communication culture. By practicing empathetic communication on social media, people can establish a more supportive and peaceful community while reducing the possibility of conflict and misunderstanding in online interactions (Qin et al., 2022).

2.5. Empathy in extended reality (XR) and the role of digital empathy in reducing social media dependency and isolation

Virtual environments are composed predominantly of computer-mediated 3D modelling that is accompanied by immersion, realism, malleability, and scalability. With the well-known virtual–physical continuum, virtual entities are exclusively placed within simulated realms of virtual reality (VR) or in hybrids augmented with virtual entities within the underlying physical realm of augmented reality (AR). In the center of the continuum, physical and virtual entities coexist to produce virtual environments referred to as mixed reality (MR) (Speicher et al., 2019). In addition, immersive possibilities can also be used to reduce exposure or limit experiences—normally visual experiences—and thus produce diminished reality (DR) situations. Virtually mediated empathy has been framed in many different ways, namely, as the ultimate empathy machine (Paananen et al., 2023). The language insinuates that empathy is induced in a deterministic way, which is inconsistent with an understanding of contextual and situated understandings of empathy. Each technology is constrained by the affordances of its use. VR may provide an experience of feeling and understanding the difficulties of other people through immersion, whereas AR technology offers knowledge about people who augments the physical person's space. Tracy Packiam Alloway & Rachel Carpenter, 2021).

Digital empathy and emotional intelligence help reduce social media addiction, loneliness, and feelings of despair. Supportive online interactions foster a sense of connection and belonging, lowering the need for constant validation and decreasing isolation (Hu et al., 2020). Empathic communication also provides emotional support, helping individuals feel understood and less alone, which can reduce loneliness and despair (Ye et al., 2021).

3. Discussion

The findings of the research suggest an increasingly changing process in the nature of interpersonal communication between families in the age of media access. Greater reliance on and use of media resources have produced more limited, meaningful, one-on-one interactions (Sanjeeva et al., 2024). With greater screen time than face-to-face conversational time, there is weakened emotional connectedness. This finding is corroborated by research that shows that media distractions lead to overall reduced emotional availability and reactivity, even more so in parent–child relationships (Lee et al., 2024).

These findings support the theory that digital empathy exists along with other traditional types of emotional connectedness (Abou Hashish, 2025). Digital communication involves far fewer nonverbal indicators needed for an authentic emotional connection or experience, but it still provides understanding and support, especially in structured environments such as OMHCs. The findings also suggest that digital empathy and connectedness are far more contextual and tend to provide the best emotional connection in safer and more meaningful digital contexts (Raamkumar & Yang, 2022).

Additionally, Salazar Kämpf et al. (2023) reported that in digital interactions, cognitive empathy is more likely to decline than affective empathy. This is because internet multitasking and attention splitting make it difficult to take thoughtful

perspectives. The results of research on empathy models emphasize how crucial it is to deliberately integrate cognitive and emotional elements while creating communication technologies (Shamsie, 2024).

Finally, Suliantoro and Syakhrani (2025) showed that technology has two sides: depending on its intended use, it either increases isolation or provides useful support networks. Qin et al. (2022) promoted intentional technology use, stressing the need to balance digital platform use with unbroken human connection time. Creating explicit rules for emotional responsiveness and digital etiquette is essential for creating empathetic encounters both online and offline.

Research has analysed empathy in face-to-face, digital, and XR settings, resulting in more advanced knowledge of how emotional relationships develop with technology. This highlights the importance of digital empathy when moving to more socially engaging activities that are less dependent on and separated by social media but contain the same richness of face-to-face interaction. The research embodies many exciting ideas for creating emotional intelligent systems through a combination of psychological theories and technical usecases, and its exploration of empathy frameworks enables the study to present its impact and breadth on the basis of multidimensional and interdisciplinary abstraction. Overall, this research explores and combines emotional theory and distractive design with a call for more human virtual interactions.

4. Conclusion

The research investigated the effects of digital technology on interpersonal communication within families, specifically how continual gadget use affects emotional involvement and connection. More screen time and media multitasking reduce interpersonal cues and self-disclosure, which cause family members to become emotionally estranged from one another. Strong family bonds require intentional and emotionally sensitive communication, not just computer literacy, as the research has demonstrated. The research also validated the applicability of conceptual empathy models in modern digital interactions. Although empathy flourishes in virtual settings, it is usually of lower quality than in-person interactions, especially in situations lacking emotional nuance or context. Nonetheless, online mental health forums and organized digital support networks, as exemplified in the literature, have been shown to enhance emotional connectedness. By examining communication behavior, emotional well-being, and media influence, this research highlights a framework for determining how the nature of digital empathy has changed. Research has demonstrated that developing human connections in the digital age requires technology literacy and emotional intelligence. The implications are relevant to families, educators, and platform designers with a desire to create more compassionate digital environments. The research was confined to urban individuals with access to digital media; future research could expand into rural and cross-cultural settings. Longitudinal research is needed to examine the long-term emotional effects of digital communication.

Ethical Considerations

Not applicable.

Conflict of Interest

The authors declare no conflicts of interest.

Funding

This research did not receive any financial support.

References

- Abou Hashish, E. A. (2025). Compassion through technology: Digital empathy concept analysis and implications in nursing. *Digital Health*, *11*, 20552076251326221. <https://doi.org/10.1177/20552076251326221>
- Braune-Krickau, A., Kostić, T., Merkaš, M., Tammisalo, N., & McDaniel, B. T. (2021). *Effects of parents' smartphone use on children's emotions, behavior, and subjective well-being*. *Education Sciences*, *15*(1), 8. <https://doi.org/10.3390/educsci15010008>
- Braune-Krickau, K., Schneebeli, L., Pehlke-Milde, J., Gemperle, M., Koch, R., & von Wyl, A. (2021). Smartphones in the nursery: Parental smartphone use and parental sensitivity and responsiveness within parent-child interaction in early childhood (0–5 years): A scoping review. *Infant Mental Health Journal*, *42*(2), 161–175. <https://doi.org/10.1002/imhj.21908>
- Cánovas, L.; Carrascosa, A.J.; García, M.; Fernández, M.; Calvo, A.; Monsalve, V.; Soriano, J.F.; Group, E.S. (2018) Impact of empathy in the patient-doctor relationship on chronic pain relief and quality of life: A prospective study in Spanish pain clinics. *Pain Med.* *19*, 1304–1314. [10.1093/pm/pnx160](https://doi.org/10.1093/pm/pnx160)
- Chen, Y., & Xu, Y. (2021). Exploring the effect of social support and empathy on user engagement in online mental health communities. *International Journal of Environmental Research and Public Health*, *18*(13), 6855. <https://doi.org/10.3390/ijerph18136855>
- Duarte, A., Surugiu, R., Moraru, M., & Marinescu, V. (2023). Digital Empathy in Online Education: A Comparison Study between Portugal and Romania. *Comunicar: Media Education Research Journal*, *31*(76), 105–115. [10.3916/C76-2023-09](https://doi.org/10.3916/C76-2023-09)
- Grondin, F., Lomanowska, A. M., & Jackson, P. L. (2019). Empathy in computer-mediated interactions: a conceptual framework for research and clinical practice. *Clinical Psychology: Science and Practice*, *26*(4), e12298. <https://doi.org/10.1111/cpsp.12298>
- Hu, T., Zheng, X., & Huang, M. (2020). Absence and presence of human interaction: the relationship between loneliness and empathy. *Frontiers in psychology*, *11*, 768. <https://doi.org/10.3389/fpsyg.2020.00768>

- Jiang, L., & Gao, J. (2020). Fostering EFL learners' digital empathy through multimodal composing. *RELC Journal*, 51(1), 70–85. <https://doi.org/10.1177/0033688219898565>
- Johnson, P. (2022). Navigating Ethical Communication with Empathy in Social Networks. *Cyber Psychology & Behaviour*, 15(5), 388–401. <https://doi.org/10.1089/cpb.2022.234566>
- Lee, H.-E., Chang, W.-P., & Sun, J. (2023). *Family dynamics and digital distractions: A survey-based study on how co-parenting and parental phubbing shape preschoolers' media use*. *Behavioral Sciences*, 15(6), 752. <https://doi.org/10.3390/bs150600752>
- Lee, Y., Shin, H., & Gil, Y. H. (2024). Measurement of empathy in virtual reality with head-mounted displays: A systematic review. *IEEE Transactions on Visualization and Computer Graphics*. <https://doi.org/10.1109/tvcg.2024.33720763>
- Marín-López, I.; Zych, I.; Monks, C.P.; Ortega-Ruiz, R. (2019) Empathy, morality and social and emotional competencies in interpersonal interactions online. In *Thriving in Digital Workspaces*; Springer: Berlin/Heidelberg, Germany, pp. 217–233. <https://doi.org/10.1007/9>
- Marwick, A.E., & Boyd, D. (2019). *Understanding empathy in digital youth culture: A review*. *Journal of Youth Studies*, 22(2), 115–132. <https://doi.org/10.1007/s11245-024-10034-x>
- Mun, I. B., & Lee, S. (2023). *The impact of parental depression on children's smartphone addiction: A serial mediation model with parental neglect and children's self-esteem*. *Journal of Educational Computing Research*, 61(5), 1432–1455. <https://doi.org/10.1177/08944393211037579>
- Paananen, V., Kiarostami, M. S., Lik-Hang, L., Braud, T., & Hosio, S. (2023). From digital media to empathic spaces: a systematic review of empathy research in extended reality environments. *ACM Computing Surveys*, 56(5), 1–40. <https://doi.org/10.1145/3626518>
- Pawiak, A. (2024). New Technologies in the Development of Empathy: Benefits and Threats. *Horyzonty Wychowania*, 23(68), 161–170. <https://doi.org/10.35765/hw.2024.2368.15>
- Pittelkow, M. M., Aan Het Rot, M., Seidel, L. J., Feyel, N., & Roest, A. M. (2021). Social anxiety and empathy: a systematic review and meta-analysis. *Journal of Anxiety Disorders*, 78, 102357. <https://doi.org/10.1016/j.janxdis.2021.102357>
- Qin, X., Yang, F., Jiang, Z., & Zhong, B. (2022). Empathy not quarantined: Social support via social media helps maintain empathy during the COVID-19 pandemic. *Social Media+ Society*, 8(1), 20563051221086234. <https://doi.org/10.1177/20563051221086234>
- Raamkumar, A. S., & Yang, Y. (2022). Empathetic conversational systems: A review of current advances, gaps, and opportunities. *IEEE Transactions on Affective Computing*, 14(4), 2722–2739. <https://doi.org/10.1109/TAFFC.2022.3226693>
- Ranchordas, S., 2021. Empathy in the digital administrative state. *Duke LJ*, 71, p.1341. <https://doi.org/10.3390/su12093819>
- Rao, S., Alavi, H., & Good, J. (2023, April). Towards Empathic Buildings: Exploring How Smart Buildings May Be Designed to Address Occupants' Subjective Needs. In *Proceedings of the 2nd Empathy-Centric Design Workshop* (pp. 1–4). <https://doi.org/10.1145/3588967.3588974>
- Riva, G., Wiederhold, B. K., Di Lernia, D., Chirico, A., Riva, E. F. M., Mantovani, F., ... & Gaggioli, A. (2019). Virtual reality meets artificial intelligence: the emergence of advanced digital therapeutics and digital biomarkers. *Annual Review of CyberTherapy and Telemedicine*, 17, 3–7.
- Salazar Kämpf, M., Adam, L., Rohr, M. K., Exner, C., & Wieck, C. (2023). A meta-analysis of the relationship between emotion regulation and social affect and cognition. *Clinical psychological science*, 11(6), 1159–1189. <https://doi.org/10.1177/21677026221149953>
- Sanjeewa, R., Iyer, R., Apputhurai, P., Wickramasinghe, N., & Meyer, D. (2024). Empathic Conversational Agent Platform Designs and Their Evaluation in the Context of Mental Health: Systematic Review. *JMIR Mental Health*, 11, e58974. <https://doi.org/10.2196/58974>
- Saykılı, A. (2019). Higher education in the digital age: The impact of digital connective technologies. *Journal of Educational Technology and Online Learning*, 2(1), 1–15. <https://doi.org/10.31681/jetol.516971>
- Shamsie, K. (2024). Interpersonal Communication in the Age of Digital Technology. *Research Consortium Archive*, 2(3), 112–122.
- Shao, T., Zhu, C., Lei, H., Jiang, Y., Wang, H., & Zhang, C. (2024). *The relationship of parent-child technoference and child problematic smartphone use: The roles of parent-child relationship, negative parenting styles, and children's gender*. *Psychology Research and Behavior Management*, 17, 2067–2081. <https://doi.org/10.2147/PRBM.S456411>
- Sharma, A., Miner, A. S., Atkins, D. C., & Althoff, T. (2020). A computational approach to understanding empathy expressed in text-based mental health support. *arXiv preprint arXiv:2009.08441* 5263–5276. <https://doi.org/10.18653/v1/2020.emnlp-main.425>
- Speicher, M., & Brian, D. Hall, and Michael Nebeling. 2019. What is Mixed Reality?. *Association for Computing Machinery, New York, NY, USA*, 1–15. <https://doi.org/10.1145/3290605.3300767>
- Stevens, F., & Taber, K. (2021). The neuroscience of empathy and compassion in pro-social behavior. *Neuropsychologia*, 159, 107925. <https://doi.org/10.1016/j.neuropsychologia.2021.107925>
- Suliantoro, B. W., & Syakhrani, A. W. (2025). COMMUNICATING WITH EMPATHY: ETHICAL PRACTICES IN SOCIAL MEDIA. *International Journal Of Humanities, Social Sciences And Business (INJOSS)*, 4(2), 99–107.
- Sutton, T. (2020). Digital harm and addiction: An anthropological view. *Anthropology Today*, 36(1), 17–22. <https://doi.org/10.1111/1467-8322.12553>
- Thompson, N. M., Van Reekum, C. M., & Chakrabarti, B. (2022). Cognitive and affective empathy relate differentially to emotion regulation. *Affective Science*, 3(1), 118–134. <https://doi.org/10.1007/s42761-021-00062-w>
- Tracy Packiam Alloway and Rachel Carpenter. (2021). Gotta catch 'em all: Exploring the use of Pokémon Go to enhance cognition and affect. *Psychology of Popular Media* 10, 2 (2021), 178–186. <https://doi.org/10.1037/ppm0000283>
- Tran, T., Ho, M. T., Pham, T. H., Nguyen, M. H., Nguyen, K. L. P., Vuong, T. T., ... & Vuong, Q. H. (2020). How digital natives learn and thrive in the digital age: Evidence from an emerging economy. *Sustainability*, 12(9), 3819. <https://doi.org/10.3390/su12093819>
- Walker, G., & Venker Weidenbenner, J. (2019). Social and Emotional Learning in the age of virtual play: technology, empathy, and learning. *Journal of Research in Innovative Teaching & Learning*, 12(2), 116–132. <https://doi.org/10.1108/JRIT-03-2019-0046>
- Wang, X., Gao, L., Yang, J., Zhao, F., & Wang, P. (2020). Parental phubbing and adolescents' depressive symptoms: Self-esteem and perceived social support as moderators. *Journal of Youth and Adolescence*, 49(2), 427–437. <https://doi.org/10.1007/s10964-019-01185-x>
- Wiederhold, B.K., & Riva, G. (2019). Virtual reality therapy: Emerging topics and future challenges. *Cyberpsychology, Behavior, and Social Networking*, 22(1), 3–6. <https://doi.org/10.1089/cyber.2018.29136.bkw>
- Xie, X., & Xie, J. (2020). Parental phubbing accelerates depression in late childhood and adolescence: A two-path model. *Journal of Adolescence*, 78, 43–52. <https://doi.org/10.1016/j.adolescence.2019.12.004>



- Ye, S., Ho, K. K., & Zerbe, A. (2021). The effects of social media usage on loneliness and well-being: analysing friendship connections of Facebook, Twitter and Instagram. *Information Discovery and Delivery*, 49(2), 136-150. <https://doi.org/10.1108/IDD-08-2020-0091>
- Zhou, S., Yang, H., Ye, M., Ding, N., & Liu, T. (2024). Inferring human vision in a human-like way: Key factors influencing the cognitive processing of level-1 visual perspective-taking. *Communication Research*, 00936502241302569. <https://doi.org/10.1177/00936502241302569>
- Zych, I., Baldry, A. C., Farrington, D. P., & Llorent, V. J. (2019). Are children involved in cyberbullying low on empathy? A systematic review and meta-analysis of research on empathy versus different cyberbullying roles. *Aggression and Violent Behavior*, 45, 83- 97. <https://doi.org/10.1016/j.avb.2018.03.004>