Social Media's Influence on Children's Emotional and Social Growth: Exploring the Role of Software Media Interaction

P.S.V. Vachaspati, PhD
Bapatla Engineering College
Bapatla-522102
Andhra Pradesh, India

P. Pardhasaradhi, PhD
Bapatla Engineering College
Bapatla-522102
Andhra Pradesh, India

P. Jayadeva Saketh, PhD
Deloitte
Hyderabad- 500032
Telangana, India

ABSTRACT
Social media has become a part of children's lives during a crucial period of social development, where they learn about relationships and practice social behaviors with their parents, friends, and educators   and other elements.   Some Social media scaffolds are designed to foster long-term emotional connection and can play the roles of friends, teachers, and caregivers. As a result, they hold the potential to shape children's empathy development. This paper explores how communication with social media can affect children's social and emotional development, focusing on software media interaction, psychology, and neuropsychology. The exploration idea behind this proposal shows that, the media or artificial intelligence theoretically have high chances of influencing the development of empathy in children, depending on their design, intensity, and context of use. This gives a good chance of empirical understanding about the kind of effect they might have on children's mind. Therefore, there is a need for studies investigating the effects on children's social and emotional development of long-term regular and consistent communication with media of various designs and in different situations.

Keywords
Children, Communication, Digital Companionship, Early childhood, Empathy development, Social media.

1. INTRODUCTION
In recent years, advancements in social robotics have led to the creation of robotic teachers, nannies, companions for children with Autism Spectrum Condition (ASC), and socially interactive toys [1][2][3][4]. Extensive research has been dedicated to enhancing the interaction between people and social media [4], aiming to cultivate stronger relationships between them. A prominent trend in current social robotics research involves the development of social media specifically designed for particular purposes. These technologies are intended to establish long-term emotional connections with their users and often feature a human-like appearance to fulfill human roles. As a result, it seems plausible that media will soon become one of the early social influences for children, alongside parents, teachers, and peers.

The most recent understanding of empathy, shared by the majority of researchers [5], encompasses both affective and cognitive components. The development of affective empathy in children [6] heavily relies on parental practices, while cognitive empathy gradually emerges through the process of role-taking, typically starting around the age of four[7]. During this period, children actively seek to comprehend emotions and retain them in their memory for future daily experiences

[11][15]. Through this process, children acquire knowledge about the emotional responses triggered by different actions, gradually enhancing their comprehension of others' mental states. Engaging in collaborative play with peers holds particular significance during this stage, as it fosters the development of cognitive empathy. By striving to understand the emotional behaviors of their playmates and the underlying reasons, children can effectively achieve their communication objectives [8]. While the precise psychological mechanisms of transmitting prosaically behaviors between individuals are yet to be fully elucidated [7][15], it is evident that the quality of children's social connections during early childhood significantly impacts their empathetic development.

The purpose of designing immersive media for long-term emotional engagement with children, where they play roles such as tutors, babysitters, and friends, raises concerns about the quality of emotional communication these media can offer. Although humans tend to socially and emotionally relate to information and communication technologies, even when aware that they are interacting with machines, children engage in imaginative play with toys, which positively contributes to their development. This brings us to the question: How does immersion differ from other ICTs and toys, and what is the potential impact on children's social and emotional development?

Unlike other technologies, immersive media are designed to have agency in communication. They are built to naturally interact with users, using images on the screen to express non-verbal behaviors. These media can establish and maintain eye contact through face recognition techniques, convey understanding, encouragement, and curiosity through para-linguistic utterances, and even hide imperfections, like repeating sentences when speech recognition fails, through facial expressions such as confusion, head nods, and bodily motions [9]. Moreover, these media are designed to evolve over time and adapt to a specific user's needs, requiring memory to learn from previous interactions [10][15]. However, designing media or clips for long-term interactions remains challenging.

Furthermore, there is a growing trend of designing media for empathic interactions with children. Despite the fascinating achievements in the field of social media, they still fall short of communicating on a human level. This raises the crucial question of the potential influence of using social media with preschool children on their social and emotional development. Addressing this concern is necessary to ensure responsible and mindful use of such media in children's lives

2. PRESENT DAY SITUATION
Advancements in Science and Technology wield a profound influence on various aspects of people's lives. Among

the many objectives of technological progress, one crucial area is the transformation of communication and social interaction patterns. Presently, achieving remote communication no longer requires grappling with complex technologies; instead, the general public can effortlessly access applications that facilitate seamless communication. Social media has emerged as a prominent means of achieving this communication ease.

The evolution of cyberspace has fundamentally altered the dynamics of social interaction within society. In the past, contacting distant relative involved laborious methods such as sending smoke signals, employing carrier pigeons, or using traditional letters, which consumed considerable time. However, the advent of social media has revolutionized this process. Not only does social media facilitate swift and convenient communication, but it also serves as a versatile platform for entertainment, information dissemination, relationship-building, rekindling old connections, and even as a promising avenue for business ventures for those adept at its usage.

Remarkably, the user base of social media platforms is increasingly diverse, encompassing individuals of all age groups - from adults and teenagers to children and even toddlers. This demonstrates the far-reaching impact and pervasive nature of social media progress in contemporary society.

The rise of digital technology has supplanted traditional human-to-human interaction, often without realizing that it can diminish direct engagement with closest loved ones. A prime example is the interaction between parents and children at home, where their attention may be absorbed by gadgets, leading to reduced face-to-face interactions. Despite this trend, it's crucial to acknowledge that gadgets are not a child's primary necessity [16] [17].

While there is limited direct discussion regarding the impact of media characters on children's empathy development, researchers engaged in related studies [12][13] have brought up this crucial inquiry. They have expressed apprehensions about the parasocial nature of relationships formed with machines, wherein children might struggle to distinguish between their sense of self and others, which is a fundamental aspect of empathy. In media, characters often serve as extensions of the user's self rather than distinct social entities [12][13], adding to the complexity. As a result, the ethical implications of characters potentially influencing children towards prosocial behavior remain uncertain.

Numerous researchers are actively engaged in the development and evaluation of educational and therapeutic programs that incorporate media, with the primary objective of assisting children in enhancing their social skills [14].

3. GENERAL SITUATION

Childhood marks the inception of human life, and its intricacies, particularly during early childhood, lay the essential groundwork for later stages of human development, such as adolescence and adulthood. The complexity of early child development necessitates a multitude of stimuli to attain optimal growth. From infancy, humans embark on their journey of learning, absorbing information from their surroundings. Through various experiences, they acquire knowledge about life as an integral part of their learning process. Every aspect and element influencing human life from birth necessitates a harmonious interplay of genetic and environmental factors to foster the most enriching learning experiences [16][17].

Technological advancements have led to the creation of numerous creative and engaging games, which have become highly favored by children. This indirect benefit has a significant impact on enhancing children's creativity. The positive impacts of information technology development are evident in these aspects [16].

4. EARLY CHILDHOOD GROWTH

The concept of understanding early childhood pertains to the crucial period from 0 to 5 years, often referred to as the golden ages. During this time, proper care and nurturing significantly influence a child's future, shaping them into individuals who can be expected to contribute meaningfully to their society [18].

Early childhood is marked by the fascinating ability to imitate and engage in activities typically performed by adults. Children joyfully mimic adult movements in a simple manner. During the age of 0-2 years, their abilities are mainly limited to reflexes, basic language, an understanding of the present moment, and the immediate surroundings. Communication plays a significant role in the characteristics of early childhood [17][18].

1. The child expresses themselves through a combination of words and gestures.
2. Language skills in children are continually nurtured, enabling them to effectively convey their needs and form meaningful connections with others.

5. EXPERIMENTS & OBSERVATIONS

15 Children of age 3 to 6 and 10 to 15 years are randomly selected. They were shown clips and they were asked questions about clips. They answered and again empathy was explained to them. Again they were shown similar clips and were questioned again. They have answered positively. Observation: Empathy can be taught to some extent.

a. ***Teaching Empathy:*** Observations from the Study with Children of Different Age Groups is as follows: Empathy, the ability to understand and share the feelings of others, is a valuable skill that contributes to positive social interactions and relationships. While empathy is considered a natural human trait, its development can be influenced by various factors, including education and exposure to empathetic experiences. These observations from the study involving two groups of children aged 3 to 6 and 10 to 15, where empathy was taught through video clips and subsequent discussions. The results suggest that empathy can be taught to some extent, highlighting the potential for empathy development through intentional interventions.

b. ***Methodology:*** The study randomly selected two groups of children, one consisting of 15 participants aged 3 to 6 years, and the other with 10 participants aged 10 to 15 years. The children were shown video clips depicting situations evoking different emotions, such as sadness, happiness, or anger. After each clip, they were asked questions to assess their understanding of the characters' emotions and perspectives. Following this, empathy was explained to the children, emphasizing the importance of understanding and relating to others' feelings. The same set of video clips was shown again, and the children were asked similar questions to evaluate any changes in their responses.

c. **Observations:**
   i. *Increased Awareness and Understanding:* After the initial exposure to the video clips, both age groups demonstrated an enhanced awareness and understanding of the characters' emotions. The children were able to correctly identify the emotions displayed in the videos and express basic empathetic responses, such as acknowledging that a sad character needed comfort.
   ii. *Development of Perspective-Taking:* The discussions and explanations about empathy proved effective in fostering perspective-taking abilities in both age groups. The

children showed improved understanding of the characters' perspectives and motivations, going beyond merely identifying the displayed emotions. They displayed empathy by considering the reasons behind the characters' emotions and suggesting appropriate responses.

iii. *Positive Changes in Empathetic Responses:* Following the explanation of empathy, the children displayed positive changes in their empathetic responses when re-watching the video clips. They exhibited deeper levels of empathy, expressing concern, suggesting solutions, or offering comfort to the characters in distress. The children's responses indicated a more nuanced understanding of the characters' emotions and a desire to alleviate their distress.

iv. *Age-Related Differences:* While both age groups showed improvements in empathy, the older group (10 to 15 years) displayed a more advanced level of empathy compared to the younger group (3 to 6 years). The older children demonstrated a greater ability to infer complex emotions and understand the underlying reasons behind them. Their responses reflected more detailed and thoughtful empathetic perspectives.
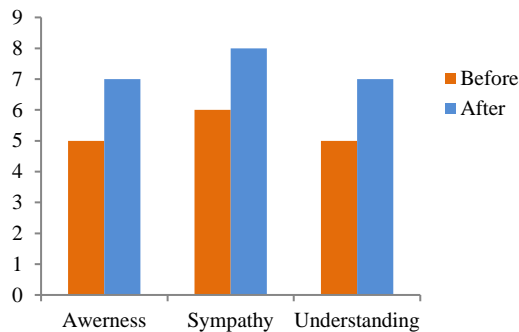

Fig 1: The empirical Observations of levels of feelings of the subjects (Children) are shown above

d. **Conclusion:** The study's observations suggest that empathy can be taught to some extent through intentional interventions, such as showing video clips and engaging in subsequent discussions. Both age groups exhibited increased awareness, understanding, and empathetic responses towards the characters depicted in the videos. The study highlights the potential for intentional empathy-focused interventions to positively impact children's empathy development.

It is important to note that the study's sample size was limited, and the results may not be generalizable to all children. Long-term studies with larger and more diverse samples would provide a more comprehensive understanding of empathy development in different age groups. Nonetheless, the study underscores the value of deliberate efforts to teach and nurture empathy in children, emphasizing its potential as a skill that can be developed through education, exposure, and intentional interventions. It is further to be explored a few more techniques to develop Empathy in children. It is to be explored the direction of AI.

6. FURTHER EXPLORATION

Chatbots to improve empathy in children using chatbots to improve empathy in children is an interesting approach that can potentially have positive outcomes. Here are some ways Chatbots can be utilized to enhance empathy skills in children:

1. *Story-telling:* Chatbots can engage children in interactive storytelling, where they encounter characters from different backgrounds and situations. Through these interactions, Chatbots can guide children to understand and empathize with the emotions and perspectives of others.

2. *Role-playing:* Chatbots can simulate real-life scenarios where empathy is required, such as conflicts or challenges. Children can practice responding empathetically to these situations and receive feedback from the Chatbot on their responses, helping them develop their empathetic skills.

3. *Active listening and reflection:* Chatbots can encourage children to express their thoughts and emotions, acting as non-judgmental listeners. By reflecting on their own experiences and feelings, children can develop a deeper understanding of empathy and learn to listen and support others.

4. *Virtual companionship*: Chatbots can provide companionship to children, fostering emotional connections. Through regular conversations with the Chatbot, children can develop empathy as they become attuned to the Chatbot's emotions and well-being.

5. *Cultural diversity exploration:* Chatbots can introduce children to different cultures, traditions, and perspectives. By interacting with Chatbots that represent various ethnicities, backgrounds, and languages, children can broaden their understanding of diversity and develop empathy towards people from different cultures.

6. *Emotional literacy:* Chatbots can help children recognize and label their emotions. By providing a safe and non-judgmental space to discuss feelings, chatbots can empower children to understand their own emotions better and empathize with the emotions of others.

7. *Collaboration and problem-solving:* Chatbots can facilitate collaborative activities that require teamwork and problem-solving. Through these interactions, children can develop empathy by understanding and valuing the ideas, perspectives, and contributions of others.

It's worth noting that while chatbots can support empathy development in children, they should not be seen as a substitute for human interactions and relationships. The involvement of parents, teachers, and other caregivers is crucial to reinforce and model empathetic behavior in real-life contexts.

7. TECHNIQUES TO DEVELOP EMPATHY IN CHILDREN USING AI

1. *Virtual Empathy Buddies:* Create chatbot companions that children can interact with on a regular basis. These chatbots can share their own experiences, emotions, and challenges, allowing children to practice empathy and develop a sense of compassion towards their virtual friends.

2. *Emotion Recognition:* Design chatbots that can recognize and interpret facial expressions and emotions. Children can engage in activities where they express various emotions, and the chatbot provides feedback and encourages discussions about empathy and understanding different emotional states.

3. *Social Issue Discussions:* Develop chatbots that engage children in conversations about social issues like poverty, bullying, or environmental concerns. The chatbots can present different perspectives, share stories, and guide children towards empathetic solutions and actions.

4. *Interactive Stories:* Create interactive stories where children make choices that impact the emotions and well-being of the characters involved. The chatbot can discuss the consequences of these choices, emphasizing empathy and considering the feelings and needs of others.

5. *Empathy Challenges:* Present children with empathy challenges through chatbot-led scenarios. For example, the chatbot could describe a situation and ask the child how

they would respond empathetically. Feedback and guidance from the chatbot can help children refine their understanding of empathy.

6. *Empathy Journaling*: Encourage children to engage in empathy journaling with a chatbot. The chatbot can prompt reflection on daily experiences, interactions, and emotions, guiding children to consider the perspectives and feelings of others in their writing.

7. *Collaborative Problem-Solving:* Design chatbot led problem-solving activities that require teamwork and empathy. Children can work together with the chatbot to solve challenges, emphasizing the importance of listening, understanding, and respecting each other's ideas and opinions.

8. *Cultural Exchange:* Develop chatbots that represent different cultures and encourage children to engage in conversations about cultural diversity. Through these interactions, children can gain a deeper understanding of different customs, traditions, and beliefs, fostering empathy and respect for cultural differences

7.1 Virtual buddies

Virtual Buddies, also known as digital companions or virtual friends, are interactive entities created to provide companionship and support in the digital realm. These virtual beings exist in various forms, ranging from chatbots and virtual pets to humanoid avatars. With advances in technology, Virtual Buddies have gained popularity as a means of companionship, especially in situations where physical interaction may be limited. This aims to explore Virtual Buddies, their potential benefits, and considerations surrounding their use in providing emotional support and connection.

Virtual Buddies serve as digital companions that offer emotional support to individuals. Through conversations, activities, and interactions, these entities are designed to simulate human-like companionship. They can provide a listening ear, engage in discussions, and offer advice or encouragement. For children who may feel lonely, socially isolated, or in need of non-judgmental support, Virtual Buddies can fill a void and offer a sense of connection and understanding.

i. *Customization and Personalization:* One of the key features of Virtual Buddies is their ability to be customized and personalized to suit individual preferences. Teachers or parents can often personalize the appearance, personality traits, and interactions of their digital companions to children. This customization allows individuals to tailor their Virtual Buddies to align with their own interests, needs, and desired level of companionship.

ii. *Versatility and Accessibility:* Virtual Buddies have the advantage of being available anytime and anywhere, as long as there is an internet connection. They can be accessed through various devices, such as smartphones, tablets, or computers. This versatility and accessibility make Virtual Buddies an appealing option for those seeking companionship in situations where physical presence may not be feasible or readily available, such as during travel, periods of isolation, or for individuals with limited social interactions.

Virtual Buddies have emerged as digital companions offering emotional support, personalized experiences, and companionship in various contexts. With their customization options, accessibility, and potential therapeutic benefits, they provide an avenue for connection and comfort in the digital realm. However, it is essential to navigate the ethical considerations associated with their use to ensure transparency, protect vulnerable individuals, and uphold privacy standards. As technology continues to advance, Virtual Buddies have the potential to play a valuable role in providing companionship and emotional support, complementing human interactions and fostering a sense of connection in our increasingly digital world.

7.2 An overview of the requirements of the Design

Considering the situational requirements, authors explored and developed the design overview. Designing chatbots that can recognize and interpret facial expressions and emotions involves combining various technologies and techniques. Here's a high-level overview of the steps involved in creating such chatbots:

1. *Data collection:* Gather a diverse dataset of facial expressions and emotions. This dataset should include images or videos of people displaying different emotions, along with corresponding labels indicating the expressed emotion.

2. *Preprocessing:* Preprocess the dataset by normalizing and resizing the images or videos. This step helps ensure consistency in the input data and reduces noise or variations that might affect the model's performance.

3. *Feature extraction:* Extract relevant features from the preprocessed data. You can use techniques like facial landmark detection or deep learning-based approaches such as convolutional neural networks (CNNs) to identify key facial features like eyes, eyebrows, mouth, etc.

4. *Emotion classification:* Train machine learning or deep learning model to classify emotions based on the extracted features. This model can be a CNN, recurrent neural network (RNN), or a combination of both. The model should be trained on the labeled dataset to learn the relationship between facial expressions and emotions.

5. *Real-time emotion recognition:* Integrate the trained model into the chatbot system, enabling it to recognize emotions in real-time. This can be done by processing the live video feed from the user's webcam or by analyzing images sent by the user.

6. *Natural language processing:* Combine the facial expression and emotion recognition capabilities with natural language processing (NLP) techniques to interpret the user's emotional state within the context of the conversation. This integration allows the chatbot to respond appropriately based on the detected emotions.

7. *Contextual understanding:* Incorporate contextual understanding to enhance the accuracy of emotion interpretation. Consider factors like previous interactions, user preferences, and conversation history to better interpret the user's emotional state and provide personalized responses.

8. *Continuous learning:* Implement mechanisms for the chatbot to continuously learn and improve its emotion recognition and interpretation abilities. This can involve feedback loops, user ratings, or additional data collection to refine the model over time.

It's important to note that designing chatbots capable of recognizing and interpreting facial expressions and emotions is a complex task that requires substantial data, computational resources, and expertise in machine learning and NLP. It may also involve ethical considerations regarding user privacy and consent.

7.3 Stories

The Impact of Interactive Stories: Fostering Empathy in Children through Chatbots. Empathy, the ability to understand and share the feelings of others, is a fundamental quality that contributes to positive social interactions and relationships. Nurturing empathy in children is essential for

fostering compassion and creating a more empathetic society. In recent years, chatbots have emerged as interactive storytelling tools that can engage children in meaningful ways. This essay explores the potential of interactive stories of empathy delivered through chatbots to enhance children's empathy skills.

1. *Emotional Connection and Identification:* Interactive stories delivered by chatbots have the ability to create emotional connections with children. Through well-crafted narratives and relatable characters, chatbots can help children identify with the experiences and emotions of others. By immersing themselves in these stories, children can develop a deeper understanding of different perspectives and empathize with the characters' joys, sorrows, and challenges.

2. *Perspective-Taking and Role-Play:* Chatbots can facilitate perspective-taking and role-play, both of which are crucial components of empathy development. By presenting diverse scenarios and allowing children to take on different roles within the stories, chatbots encourage children to consider alternative viewpoints and imagine themselves in others' situations. This process enhances their ability to understand and empathize with the characters' emotions and experiences.

3. *Safe and Judgment-Free Environment:* Chatbots provide a safe and non-judgmental environment for children to explore and express their emotions. Interactive stories delivered through chatbots allow children to engage with complex emotions and dilemmas without fear of criticism or negative judgment. This safe space encourages children to explore empathy openly, enabling them to develop their emotional intelligence and compassion.

4. *Active Participation and Decision-Making:* Interactive stories delivered by chatbots promote active participation and decision-making, allowing children to shape the narrative outcomes. By involving children in decision-making processes within the story, chatbots encourage them to consider the consequences of their choices on the characters' emotions and well-being. This engagement strengthens their empathy skills by fostering a sense of responsibility for others' feelings.

5. *Reflection and Discussion Opportunities:* Chatbots can provide opportunities for reflection and discussion after experiencing interactive stories. By prompting children to reflect on the story's events, characters, and emotions, chatbots facilitate critical thinking and emotional processing. Additionally, chatbots can engage in dialogue with children, encouraging them to express their thoughts, concerns, and insights related to empathy. These discussions further deepen their understanding and application of empathy in real-life situations.

6. *Personalized and Tailored Experiences*: Chatbots can offer personalized and tailored experiences based on a child's individual needs and preferences. By adapting the storytelling elements to align with a child's developmental stage, interests, and challenges, chatbots provide a more engaging and impactful experience. This personalization enhances the relevance and resonance of the stories, optimizing their potential to nurture empathy in each child.

7. *Continuous Learning and Expansion of Empathy Skills:* Chatbots can continuously evolve and expand their library of interactive stories to address a wide range of empathy-related themes. By offering a diverse collection of narratives that explore various cultures, experiences, and social issues, chatbots provide ongoing opportunities for children to broaden their understanding of empathy. This continuous learning fosters empathy as an ongoing journey rather than a static skill.

Interactive stories of empathy delivered through chatbots have the potential to significantly impact children's empathy development. By creating emotional connections, promoting perspective-taking, providing a safe environment, encouraging active participation, facilitating reflection and discussion, offering personalized experiences, and enabling continuous learning, chatbots empower children to become more empathetic individuals. As real world harness the power of technology, integrating interactive storytelling into the lives of children can pave the way for a more compassionate and empathetic future generation.

7.4 Praising

Empathy, the ability to understand and share the feelings of others, is a fundamental aspect of healthy social interactions. Recognizing and encouraging empathy in children plays a vital role in their emotional development and creates a foundation for compassionate behavior throughout their lives. This essay aims to explore the notion that praising children for their empathetic actions can indeed make them more empathetic, emphasizing the positive impact it has on their emotional intelligence, social skills, and overall well-being.

1. *Reinforcing Positive Behavior:* Praising empathetic actions serves as a powerful tool to reinforce positive behavior in children. When children receive praise for their empathetic acts, such as comforting a friend or showing kindness to a peer, they internalize the connection between their actions and the positive response they receive. This reinforcement strengthens their motivation to engage in empathetic behavior in the future.

2. *Building Self-Awareness:* By praising empathy, children become more aware of their emotions and the impact they have on others. When their empathetic actions are acknowledged and praised, they begin to recognize the positive consequences of their behavior and develop a deeper understanding of the emotions and needs of those around them. This heightened self-awareness nurtures their empathetic skills and encourages them to be more attuned to the experiences of others.

3. *Strengthening Emotional Connection:* Praising children for their empathetic actions creates a strong emotional connection between the child and the person providing the praise. This bond serves as a positive reinforcement, encouraging the child to seek further social interactions and deepen their empathetic engagement. The child's desire to maintain this emotional connection drives them to exhibit more empathetic behaviors in their relationships, thereby fostering a cycle of positive social engagement.

4. *Encouraging Prosocial Behavior:* When children are praised for their empathy, they internalize empathy as a desirable quality. The recognition and validation they receive reinforce the belief that their empathetic actions have a positive impact on others. As a result, children are more likely to engage in prosocial behavior, such as sharing, comforting, and helping, which are essential for creating a compassionate and supportive community.

5. *Developing a Positive Social Norm:* By praising empathy, digital media set a positive social norm for children. When empathetic actions are celebrated and valued, children understand that empathy is a desirable quality in social interactions. This norm influences their behavior, motivating them to engage in empathetic actions more frequently. As children witness the positive effects of their empathy and observe others being praised for similar behaviors, empathy becomes an integral part of their identity and social interactions.

8. CONCLUSION

In conclusion, the use of social media clips, virtual buddies, and interactive media has been empirically shown to be effective in fostering empathy among children. These digital tools offer immersive and relatable experiences that help young minds connect with the emotions and perspectives of others. By engaging in scenarios that require empathy and emotional intelligence, children can develop a deeper understanding of the world around them. As technology continues to evolve, integrating these tools thoughtfully into educational and social development programs could play a crucial role in nurturing a more empathetic and emotionally aware generation.

While social media clips, virtual buddies, and interactive media have shown promise in developing empathy in children, several challenges accompany their use. First, excessive screen time and overreliance on digital tools can lead to reduced face-to-face interactions, potentially hindering real-world social skills. Second, not all content is designed with empathy in mind, raising concerns about exposure to negative or harmful media. Third, there is a risk of superficial engagement, where children may not fully internalize the lessons intended. Finally, disparities in access to technology can widen the empathy gap between different socioeconomic groups.

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