HTechJ Health and Technology Journal (HTechJ)

Volume 04 Number 02
April 2026
p-ISSN: 2986-5662
e-ISSN: 2985-959X

The Influence of Gadgets on the Language Development of Children Aged 3-4 Years

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Abstract:
The widespread use of screen-based media in early childhood has raised concerns regarding its potential influence on language development, particularly expressive language skills. Although digital devices may provide educational opportunities, excessive or unsupervised use may reduce verbal interaction between children and caregivers. This study aimed to examine the relationship between gadget use and expressive-language development among children aged 3–4 years. A descriptive cross-sectional mixed-methods approach was employed, integrating thematic qualitative analysis with categorical descriptive findings. Thirty children aged 3–4 years were selected using purposive sampling. Data were collected through structured observations, semi-structured interviews with parents, and assessments of children's daily gadget-use patterns. Expressive-language development was evaluated based on children's ability to answer questions appropriately, express emotions using descriptive vocabulary, and convey opinions. The findings showed that 60% of children (n = 18) demonstrated indicators of delayed expressive-language development, particularly in responding to questions and expressing personal opinions. Limited emotional vocabulary was also observed in several participants and was frequently linked by parents to prolonged gadget exposure and reduced face-to-face interaction. Conversely, some children who accessed educational content with parental guidance showed emerging language abilities, including improved vocabulary recognition. These findings suggest that while educational digital media may support early learning, excessive or unguided gadget use may limit opportunities for interactive communication, which is essential for expressive-language development. Balanced gadget use, active parental mediation, and early screening of language development are therefore critical to support optimal communication skills in early childhood.

Article info:
Submitted:
04-12-2025
Revised:
22-12-2025
Accepted:
20-01-2026

Keywords:
early childhood, expressive language, gadgets, screen time

DOI: https://doi.org/10.53713/htechj.v4i2.585

INTRODUCTION

Language development is a fundamental component of early childhood growth, forming the basis for cognitive functioning, social interaction, and emotional regulation (Tilbe & Gai, 2022). Through language, children learn to construct meaning, express ideas, and participate in reciprocal communication with others (Hamzah et al., 2023). Early language competence also supports the development of higher-order thinking skills, including problem solving and reasoning (Heffington & Coady, 2023). The early childhood period, particularly from birth to six years of age, is a critical developmental window during which foundational language abilities rapidly emerge, including expressive vocabulary, sentence formation, and conversational turn-taking (Abah et al., 2025).

Volume 04 Number 02
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e-ISSN: 2985-959X

The development of language in young children is widely understood through a social interactionist perspective, which emphasizes the importance of interpersonal communication in language acquisition (Ghani et al., 2022). According to this perspective, children develop language through meaningful social interactions with more competent language users, such as parents, caregivers, and educators (Washington-Nortey et al., 2022). These interactions provide opportunities for scaffolding, joint attention, and responsive dialogue, which facilitate vocabulary growth and communicative competence (Mihai & Classen, 2023). Consequently, environments that limit interactive communication may constrain opportunities for children to practice and refine expressive-language skills (Monteiro et al., 2024).

In recent years, the rapid expansion of smartphones and digital media has transformed young children's everyday environment (Massaroni et al., 2023). Gadgets have become increasingly accessible, leading to greater screen exposure even among preschool-aged children (Mustonen et al., 2022). While digital devices can provide educational content that supports early literacy and learning, their widespread use has raised concerns regarding potential developmental consequences (Liu et al., 2024). Excessive or unsupervised gadget use may reduce the frequency and quality of face-to-face interactions between children and caregivers, potentially limiting opportunities for language-rich communication (Al Baqi & Afiah, 2025).

Several studies have suggested that prolonged screen time may be associated with delayed language development, particularly in expressive communication (Wan et al., 2025). Children who spend extended periods interacting with digital devices may experience fewer conversational exchanges, which are essential for the development of vocabulary, emotional expression, and narrative skills (Glick et al., 2022). However, the relationship between gadget use and language development is complex. It may depend on factors such as the type of content accessed, the duration of use, and the presence of parental mediation (Alkouri & Aldhafeeri, 2026).

Expressive-language development is operationalized through several key indicators, including children's ability to answer questions appropriately, use descriptive vocabulary to express emotions, and articulate opinions during social interaction (Fernandes & Lima, 2024). Examining how patterns of gadget use relate to these indicators is important for identifying potential developmental risks at an early stage (Pradnyandari et al., 2025). Therefore, this study aims to explore the relationship between gadget use and expressive-language development among children aged 3–4 years.

METHOD

Research Design

This study employed a descriptive cross-sectional mixed-methods design that integrated qualitative thematic analysis with categorical descriptive outputs. The approach enabled the exploration of patterns of gadget use and their relationship with expressive-language development in early childhood. The qualitative component focused on identifying recurring interaction patterns and communication behaviors during child–environment engagement, while the descriptive outputs provided contextual information on gadget exposure. Reporting of the study followed the guidelines of the *Standards for Reporting Qualitative Research (SRQR)* to ensure transparency and methodological rigor.

Participants

The study was conducted in May 2025 at three independent midwifery practice centers in Malang Regency, Indonesia: Midwife Siti Qurotul Ayuni's Independent Practice, Midwife Aisyah's Independent Practice, and Midwife Nur Lestari's Independent Practice. Participants were 30 children

aged 36–48 months, recruited through purposive sampling. Inclusion criteria included children aged 36–48 months, those with a normal birth history, and regular attendance at the independent midwifery practice centers. Children were excluded if they had a diagnosed speech or language disorder, sensory impairment, or neurological condition that could affect language development. Sample size was determined using data saturation, which was reached at 28 participants; two additional participants were included to confirm thematic consistency.

Data Collection

Data were collected using four complementary instruments. First, parents completed a 7-day media diary documenting children's daily gadget use, including device type, duration of exposure, content accessed, and usage context (independent use or co-viewing with caregivers). Second, children's expressive-language ability was assessed using an adapted Indonesian version of the REEL-3 expressive subscale, which demonstrated acceptable reliability (Cronbach's $\alpha = 0.82$). The assessment focused on three indicators: the child's ability to answer questions appropriately, use adjectives to express emotions, and articulate opinions during interaction. Third, each child participated in a 30-minute video-recorded free-play observation session designed to capture natural communication behaviors. Observations were supported by structured field notes recorded by the researchers. Finally, a demographic questionnaire was administered to parents to obtain contextual information, including maternal education level, household income, and the home literacy environment.

Data Analysis

All audio-visual recordings were transcribed verbatim and subsequently verified for accuracy. Qualitative data were analyzed using reflexive thematic analysis to identify patterns related to gadget exposure and expressive-language behavior. The analysis was supported by NVivo 14 software to facilitate coding and theme development. Two independent coders analyzed to enhance analytical rigor, achieving substantial inter-rater reliability (Cohen's $\kappa = 0.81$). In addition, quantitative outputs such as frequencies and proportions were calculated descriptively to contextualize the qualitative findings and illustrate the distribution of language development indicators among participants.

Ethical Clearance

Ethical approval for this study was obtained from the Institutional Review Board of the Institute of Technology, Science and Health, Dr. Soepraoen Hospital (Approval No. 041/KEPK-ITSK/V/2025). Written informed consent was obtained from parents or legal guardians prior to participation, and verbal assent was obtained from the children. All collected data were anonymized to ensure participant confidentiality and privacy throughout the research process.

Table 1. Instruments and Variables

Variable	Instrument	Indicators / Measures	Data Type
Gadget use	7-day media diary	Duration (min/day), device type, content, usage context	Quantitative (descriptive)
Expressive language	Adapted REEL-3 (Indonesian)	Answering questions, use of emotional adjectives, and opinion expression	Categorical
Observed language behavior	Free-play observation (30 min)	Verbal initiation, responsiveness, vocabulary use	Qualitative
Demographic factors	Caregiver questionnaire	Maternal education, income, and home literacy environment	Quantitative

Volume 04 Number 02
April 2026
p-ISSN: 2986-5662
e-ISSN: 2985-959X

RESULT

Participant Characteristics and Gadget Exposure

This study included 30 children aged 36–48 months (3–4 years). Based on a 7-day parental media diary, the median daily gadget use was 115 minutes (range: 60–300 minutes). For descriptive comparison, children were grouped into low (<90 min/day; n=8), moderate (90–150 min/day; n=12), and high (>150 min/day; n=10) screen-time categories.

Expressive Language Development

Expressive language was assessed across three indicators: answering questions, expressing feelings with adjectives, and expressing opinions. Performance was categorized as “not yet developed” (does not meet age-expected milestone) or “starting to develop” (partially meets milestone).

Answering Questions

Eighteen children (60%) were categorized as not yet developed, while twelve (40%) were starting to develop. Children in the developing category responded to simple questions, though responses were brief and inconsistent. Those categorized as not yet developed frequently did not provide verbal responses or avoided interaction.

Expressing Feelings with Adjectives

Twenty-one children (70%) were categorized as starting to develop, and nine (30%) were not yet developed. Children in the developing group could identify basic emotions such as “happy” or “sad,” while children in the not-yet-developed group showed difficulty recognizing and verbalizing emotional states.

Expressing Opinions

Twenty children (66.7%) were categorized as not yet developed, and ten (33.3%) were starting to develop. Children who met the developing criteria could express simple preferences or refusals verbally or through consistent gestures. Those categorized as not yet developed tended to remain passive during interactions.

Table 2. Expressive Language Performance by Indicator (n = 30)

Indicator	Not Yet Developed, n (%)	Starting to Develop, n (%)
Answering questions	18 (60.0)	12 (40.0)
Expressing feelings (adjectives)	9 (30.0)	21 (70.0)
Expressing opinions	20 (66.7)	10 (33.3)

Language Performance by Screen-Time Category

Descriptively, children in the high screen-time group (>150 min/day) showed a higher proportion of "not yet developed" performance, particularly for answering questions and expressing opinions, compared with children in the low and moderate screen-time groups. However, two children with high screen time demonstrated relatively advanced expressive language abilities and were retained as contrasting cases.

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April 2026
p-ISSN: 2986-5662
e-ISSN: 2985-959X

Summary of Results

Overall, delays were most evident in interactive expressive language skills, particularly in answering questions and expressing opinions. Expressing basic feelings using adjectives was the most frequently achieved indicator. These findings describe the expressive-language profile of children aged 3–4 years in relation to observed gadget-use patterns and provide a foundation for interpretation in the Discussion.

DISCUSSION

The findings of this study indicate that patterns of gadget use are associated with variations in expressive-language development among children aged 3–4 years. Across the three observed indicators—answering questions, expressing emotions using adjectives, and expressing opinions—delays were most evident in interactive language skills, particularly the ability to respond to questions and articulate personal opinions. These aspects of language require active engagement in dialogue and reciprocal communication. The descriptive findings revealed that a considerable proportion of children had not yet reached age-expected expressive-language milestones, suggesting that the development of interactive communication abilities may be particularly sensitive to environmental influences during early childhood (Rowe, 2022).

Parental interviews revealed that frequent, largely unsupervised gadget use was common among participating children, often serving as a substitute for direct caregiver interaction. In many cases, gadgets were used to occupy children during daily routines, thereby reducing opportunities for face-to-face communication. From a developmental perspective, these patterns may limit children's exposure to responsive verbal engagement, which is essential for strengthening expressive-language abilities. The findings therefore suggest that increased screen exposure may indirectly affect language development by reducing the frequency and quality of social communication experiences within the home environment (Gath et al., 2022).

The observed association between gadget exposure and expressive-language delays can be interpreted through several developmental mechanisms. First, prolonged screen use may decrease opportunities for reciprocal verbal exchange, a process through which children practice vocabulary, sentence structure, and conversational turn-taking. Second, background audio from digital media may mask or compete with caregiver speech, limiting children’s ability to attend to and process linguistic input effectively. Third, highly stimulating visual content may reduce sustained attention during interpersonal communication, making it more difficult for children to engage in extended dialogue. These mechanisms collectively highlight how digital media environments may alter the interactional conditions that support language acquisition (Lantolf & Xi, 2023).

Despite the overall pattern of delayed expressive-language indicators among many participants, this study also identified several cases of positive deviance. Some children who used gadgets moderately demonstrated relatively advanced vocabulary and communicative responses. Parental reports suggested that these children frequently accessed educational content and engaged in co-viewing with caregivers. During these interactions, adults actively supported language development by naming objects, asking questions, and encouraging children to respond. This pattern indicates that the developmental impact of gadget use may depend not only on duration of exposure but also on the quality of interaction and the presence of parental mediation (Morris et al., 2022).

From a sociocultural perspective, families' reliance on gadgets in this setting may reflect broader structural and economic realities. In many Indonesian households, particularly those with dual-income parents, digital devices often function as practical tools for managing children's daily

Volume 04 Number 02
April 2026
p-ISSN: 2986-5662
e-ISSN: 2985-959X

activities when direct supervision is limited. Consequently, gadget use may serve as a temporary substitute for caregiver engagement rather than being intentionally used for educational purposes. These contextual factors underscore the importance of community-based guidance to help parents adopt balanced media-use practices (Rajagopal et al., 2025). Health professionals working in maternal and child health services, including midwives and community health nurses, may play a critical role in promoting informed parental mediation and encouraging communication-rich home environments.

CONCLUSION

This study identified notable variability in expressive-language development among children aged 3–4 years, with a substantial proportion demonstrating delays in key communicative abilities, particularly in answering questions, expressing emotions through descriptive vocabulary, and articulating opinions. Parental reports indicated that frequent and largely unsupervised gadget use may reduce opportunities for interactive dialogue between children and caregivers, thereby limiting experiences that support expressive-language development. Nevertheless, the findings also suggest that digital media can provide developmental benefits when used in moderation, particularly when children access educational content and engage in co-viewing with adults who facilitate communication. These results highlight that the developmental impact of gadget use is influenced not only by the duration of exposure but also by the quality of content and the level of caregiver involvement. Strengthening parental guidance through community-based support from midwives and early childhood educators may help families implement balanced and developmentally supportive media-use practices that promote optimal language development in early childhood.

REFERENCES

Abah, M. A., Kelvin, D. E., Ehiwario, K., Oladosu, M. A., & Yohanna, N. R. (2025). The Role of Parent–Child Interaction in Early Language Development: A Review of the Literature. *Social Science Reports.* https://doi.org/10.51470/SSR.2025.09.02.55

Al Baqi, S., & Afiah, N. (2025). Screen Time vs. Speaking Time: A Qualitative Comparison of Speech Development in Toddlers with Different Gadget Use Patterns. *Al-Athfal: Jurnal Pendidikan Anak, 11*(1), 49-68. https://doi.org/10.14421/al-athfal.2025.111-04

Alkouri, Z., & Aldhafeeri, F. J. (2026). Parental mediation of smart device use and its impact on language development in early childhood. *Scientific Reports, 16*(1), 8209. https://doi.org/10.1038/s41598-026-38833-9

Fernandes, D. M. Z., & Lima, M. C. M. P. (2024). Child development: assessment of receptive and expressive language in preschoolers. *Estudos de Psicologia (Campinas), 41,* e210045. https://doi.org/10.1590/1982-0275202441e210045

Gath, M., McNeill, B., & Gillon, G. (2022). Preschoolers' screen time and reduced opportunities for quality interaction: Associations with language development and parent-child closeness. *Current Research in Behavioral Sciences, 5,* 100140. https://doi.org/10.1016/j.crbeha.2023.100140

Ghani, N., Jamian, A. R., & Abdul Jobar, N. (2022). The Relationship Between Language Acquisition and Theory of Social Interactionist. *ICCCM Journal of Social Sciences and Humanities, 1*(4), 54–59. https://doi.org/10.53797/icccmjssh.v1i4.9.2022

Glick, A. R., Saiyed, F. S., Kutlesa, K., Onishi, K. H., & Nadig, A. S. (2022). Implications of video chat use for young children's learning and social–emotional development: Learning words, taking turns, and fostering familial relationships. *Wiley Interdisciplinary Reviews: Cognitive Science, 13*(5), e1599. https://doi.org/10.1002/wcs.1599

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p-ISSN: 2986-5662
e-ISSN: 2985-959X

Hamzah, M. Z., Nofvia De Vega, Rahayu, S. Sumihatul Ummah MS, & Petrus Jacob Pattiasina. (2023). Role-playing Method for Language Development in Elementary School. *Journal of Childhood Development, 3*(2), 36–47. https://doi.org/10.25217/jcd.v3i2.3799

Heffington, D. V., & Coady, M. R. (2023). Teaching higher-order thinking skills to multilingual students in elementary classrooms. *Language and Education, 37*(3), 308–327. https://doi.org/10.1080/09500782.2022.2113889

Lantolf, J. P., & Xi, J. (2023). Digital Language Learning: A Sociocultural Theory Perspective. *TESOL Quarterly, 57*(2), 702-715. https://doi.org/10.1002/tesq.3218

Liu, S., Reynolds, B. L., Thomas, N., & Soyoof, A. (2024). The Use of Digital Technologies to Develop Young Children's Language and Literacy Skills: A Systematic Review. *SAGE Open.* https://doi.org/10.1177/21582440241230850

Massaroni, V., Delle Donne, V., Marra, C., Arcangeli, V., & Chieffo, D. P. (2023). The Relationship between Language and Technology: How Screen Time Affects Language Development in Early Life—A Systematic Review. *Brain Sciences, 14*(1), 27. https://doi.org/10.3390/brainsci14010027

Mihai, A., & Classen, A. (2023). A Framework for Scaffolding Language Development Through Meaningful Interactions. *Young Exceptional Children.* https://doi.org/10.1177/10962506221149701

Monteiro, R., Ferreira, S., Fernandes, S., & Rocha, N. (2024). Does digital media use contribute to decreased expressive language skills of pre-school-aged children? An exploratory study in Portuguese children. *Somatosensory & Motor Research, 41*(4), 176–182. https://doi.org/10.1080/08990220.2023.2191702

Morris, A. J., Filippetti, M. L., & Rigato, S. (2022). The impact of parents' smartphone use on language development in young children. *Child Development Perspectives, 16*(2), 103-109. https://doi.org/10.1111/cdep.12449

Mustonen, R., Torppa, R., & Stolt, S. (2022). Screen Time of Preschool-Aged Children and Their Mothers, and Children's Language Development. *Children, 9*(10), 1577. https://doi.org/10.3390/children9101577

Pradnyandari, K. D. S., Thanaya, S. A. P., Saraswati, P. A. S., & Pramita, I. (2025). The Impact of Gadget Use on Personal-Social and Language Development in Preschool Children at TK Bintang Permata. *Majalah Ilmiah Fisioterapi Indonesia, 13*(2), 383-389. https://doi.org/10.24843/mifi.000000459

Rajagopal, A., Nisar, M., Morawska, A., Edwards, E. J., & Khan, A. (2025). Family-Based Interventions for Managing Screen Use in Children and Adolescents: Systematic Review, Meta-Analysis, and Intervention Component Analysis. *Journal of Psychologists and Counsellors in Schools,* 20556365261423543. https://doi.org/10.1177/20556365261423543

Rowe, M. L. (2022). Environmental influences on early language and literacy development: Social policy and educational implications. *Advances in Child Development and Behavior, 63,* 103-127. https://doi.org/10.1016/bs.acdb.2022.04.001

Tilbe, Y. T., & Gai, X. (2022). Teacher-child interactions in early childhood education and its effects on social and language development. *Early Child Development and Care, 192*(5), 761–774. https://doi.org/10.1080/03004430.2020.1798944

Wan, X., Kang, X., Chen, S., Du, J., Yan, F., & Bai, Y. (2025). Analysis of the impact of parents' electronic screen time habits, young children's screen exposure and parent-child interaction on language development delay in young children. *Frontiers in Pediatrics, 13,* 1667048. https://doi.org/10.3389/fped.2025.1667048

Washington-Nortey, P. M., Zhang, F., Xu, Y., Ruiz, A. B., Chen, C. C., & Spence, C. (2022). The impact of peer interactions on language development among preschool English language learners: A systematic review. *Early Childhood Education Journal, 50*(1), 49-59. https://doi.org/10.1007/s10643-020-01126-5