THE RELATIONSHIP BETWEEN DIGITAL DEVICE USE AND LANGUAGE DEVELOPMENT AMONG PRESCHOOL CHILDREN AGED 5–6 YEARS

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Abstract

The increasing use of digital devices among young children has raised concerns regarding its possible association with early language development. This study examined the relationship between digital device use and language development among preschool children aged 5 to 6 years in Kota Kinabalu, Malaysia. A quantitative survey design was employed involving 80 parents and 7 teachers from private kindergartens. Parents completed a questionnaire on children's digital device use, while teachers assessed language development of 80 children in listening and speaking domains using a rating scale. Data were analysed using descriptive statistics and Pearson correlation analysis. The findings showed that children's overall digital device use was at a moderate level (M = 2.50, SD = 0.342), while language development was rated at a good level for listening (M = 3.80, SD = 0.37) and speaking (M = 3.41, SD = 0.659). Pearson correlation analysis indicated a very weak and non-significant relationship between digital device use and language development (r = .097, p = .394). These findings suggest that digital device use, as measured in this study, was not significantly associated with preschool children's listening and speaking development. The study contributes local evidence to early childhood education by highlighting the need to examine not only the amount of digital device use but also the quality, purpose, and context of use in future research. Practical implications include the importance of guided, age-appropriate, and purposeful digital engagement among preschool children.

Keyword(s): digital device use; language development; preschool children; screen time; early childhood education

INTRODUCTION

In today's digital era, digital technology has become widely used across age groups for communication, learning, entertainment, management, and information access (Tanusha et al., 2023; Nathan et al., 2022). Among young children, the use of digital devices such as smartphones, tablets, computers, and televisions has become increasingly common in daily life. In Malaysia, recent studies have reported a high prevalence of digital device use among preschool children, with 95.9% of preschoolers using digital devices, particularly mobile phones, often under parental supervision to reduce exposure to inappropriate content (Alkalash et al., 2023; Nathan et al., 2022). Digital devices have also become increasingly embedded in Malaysian society, as their use is familiar across different age groups, ethnic backgrounds, and socioeconomic groups (Sobri et al., 2025). National data further indicate a growing pattern of internet use among children and adolescents, with the percentage of 5- to 17-year-olds using the internet increasing from 18.4% in 2016 to 47.0% in 2020, as reported by the Malaysian Communications and Multimedia Commission (MCMC) (Bakar et al., 2025).

Early exposure to digital devices has raised concerns among parents, educators, and researchers because some children may develop excessive or problematic usage patterns if device use is not appropriately guided (Ali & Mokhtar, 2026; Abbas et al., 2019). Previous cross-sectional studies in Malaysia have reported a high prevalence of digital device use among young children and have suggested that excessive screen exposure, particularly beyond two hours per day before school age, may be associated with developmental concerns, including language-related difficulties (Varadarajan et al., 2021; Chong et al., 2021). However, the effects of digital device use are not necessarily uniform. Supervised and educational use may provide children with opportunities for learning, digital familiarity, and exposure to language-rich content when used appropriately (Varadarajan et al., 2021; Chong et al., 2021). Therefore, the issue is not merely the presence of digital devices in children's lives, but the extent, purpose, content, and context of their use.

The increasing ownership and use of digital devices among children also reflect changing parental practices and family routines. Parents may allow children to use smartphones, tablets, or other devices for entertainment, learning, and communication purposes (Lee et al., 2023). At the same time, parents often express concerns about possible risks, including excessive use, reduced social interaction, and physical effects such as eye strain (Alkalash et al., 2023; Abbas et al., 2019). These concerns suggest the need for a balanced approach in which digital device use is managed through parental guidance, suitable content selection, and appropriate time limits.

Children aged 5 to 6 years are at a critical stage of language development, as they develop the ability to communicate, express needs, interact socially, and participate in early learning activities (Ali & Mokhtar, 2026). During this stage, language development is strongly supported by meaningful interaction with adults, peers, and the surrounding environment. However, the rapid advancement and widespread use of digital devices present both opportunities and challenges. Excessive or unguided use of digital devices may reduce opportunities for face-to-face interaction, peer communication, and active language practice. This concern became more prominent during the COVID-19 pandemic, when children's reliance on digital devices increased due to online learning and home-based activities. In contrast, controlled and supervised use of digital devices, particularly through educational applications and interactive media, may support vocabulary development, listening skills, and language learning.

Although previous studies have examined digital device use and children's development, local evidence focusing specifically on preschool children aged 5 to 6 years in Malaysia remains limited. In addition, many existing studies have focused mainly on-screen time duration, while

less attention has been given to broader patterns of digital device use, including device type, content, duration, frequency, and time of use. Therefore, this study aims to examine the level of digital device use, assess the level of language development, and investigate the relationship between digital device use and language development among preschool children aged 5 to 6 years. Specifically, this study seeks to achieve the following objectives:

1. To identify the level of digital device use among preschool children aged 5 to 6 years.
2. To determine the level of language development among preschool children aged 5 to 6 years.
3. To examine the relationship between digital device use and language development among preschool children aged 5 to 6 years.

LITERATURE REVIEW

Language development in early childhood is fundamental to children's communication, social interaction, and later academic development. For children aged five to six years, this stage is particularly important because they are developing vocabulary, sentence structure, listening comprehension, expressive language, and pragmatic language skills through interaction with adults and peers (Ali & Mokhtar, 2026; Feldman, 2019). Meaningful verbal interaction during this period supports children's ability to express needs, participate in classroom activities, and build social relationships. However, the increasing accessibility of digital devices has changed children's learning and communication environments, raising important questions about how digital device use may relate to language development.

A growing body of research suggests that excessive screen exposure may be associated with poorer language outcomes among young children. Previous studies have reported that higher screen time, particularly among toddlers and preschool children, is linked to lower vocabulary growth, weaker expressive language, and poorer developmental outcomes. For example, Madigan et al. (2019) found that greater screen time in early childhood was associated with lower developmental screening scores. Similarly, longitudinal evidence suggests that early or excessive screen use may predict later academic and language-related difficulties (Dale et al., 2015). These findings indicate that high levels of digital device use may interfere with important developmental processes during early childhood, particularly when such use replaces meaningful interaction and active communication.

One possible explanation for this relationship is social interaction displacement. Language acquisition is an interactive process requiring responsive communication, turn-taking, and verbal engagement with adults and peers. However, prolonged digital device use can reduce opportunities for face-to-face communication. Empirical studies demonstrate that higher screen time is associated with lower parent–child communication, fewer language-rich interactions, and weaker language skills (Ali & Mokhtar, 2026; Kanwal et al., 2023; Mustonen et al., 2022; Purnama et al., 2024; Sundqvist et al., 2021). Clinical and observational evidence further suggests that increased exposure may negatively affect articulation, speech development, and white matter integrity in brain structures related to language processing (Aliany & Widowati, 2024; Hutton et al., 2019). Consequently, these findings highlight that the relationship between digital device use and language development is driven not just by whether children use devices, but by the duration, frequency, intensity, and circumstances of that use.

Another important factor discussed in the literature is the quality and type of digital content accessed by children. The influence of digital device use on development is not uniform because different types of content may have different developmental implications. Passive content, such as watching entertainment videos without interaction, is more likely to be

associated with less favourable outcomes. In contrast, educational and interactive content may provide opportunities for vocabulary learning, listening comprehension, and early literacy development. High-quality educational media has been found to support more positive language outcomes compared with non-educational media (Geetha, 2025; Nobre et al., 2019). Therefore, content quality is an important consideration in understanding whether digital device use may support or hinder language development.

Parental involvement and mediation serve as important contextual factors in children's digital device use. While joint media engagement and active caregiver guidance are associated with better vocabulary retention and meaningful learning, unsupervised or passive device use provides fewer opportunities for language stimulation (Vidal-Hall et al., 2020; Wan et al., 2025; Xie et al., 2024). Because parental mediation was not directly measured as a study variable in the present research, it is discussed here strictly as a contextual element within the existing literature. Similarly, concerns regarding preschool digital device use intensified during the COVID-19 pandemic due to increased dependency on screens for online learning and home activities. While technology ensured learning continuity, systematic reviews indicate that this increased, unstructured screen exposure may have exacerbated risks for language delay by reducing face-to-face social interactions (Karani et al., 2022; Xie et al., 2024).

Nevertheless, the literature presents a balanced view, demonstrating that digital devices are not inherently harmful. Educational applications and moderate, intentional media use can support vocabulary acquisition and early literacy when combined with purposeful adult guidance and strong home literacy practices (Martinot et al., 2021; Sahrul et al., 2025). Recent reviews emphasize that this relationship is multifactorial, shaped heavily by socioeconomic background, parental education, and cultural practices (Karani et al., 2022; Nwachukwu et al., 2025). Because these broader contextual factors were not directly measured in the current study, they cannot serve as explanatory findings but are best considered as vital variables for future research.

Overall, previous research shows that the relationship between digital device use and language development in young children is complex and context-dependent. Excessive, passive, and unregulated digital device use may be associated with less favourable language outcomes because it may reduce opportunities for social interaction and active communication. In contrast, moderate, purposeful, and guided use of high-quality educational content may support language learning. Although existing studies provide important evidence, there remains a need for more local research involving Malaysian preschool children, particularly children aged five to six years. Therefore, the present study examines the relationship between digital device use and language development, specifically listening and speaking skills, among preschool children in Malaysia.

METHODOLOGY

This study employed a quantitative research design using a survey method. A quantitative approach was considered appropriate because the study aimed to identify the level of digital device use, determine the level of language development, and examine the relationship between digital device use and language development among preschool children aged 5 to 6 years. Quantitative research involves the systematic collection, analysis, and interpretation of numerical data to describe patterns and examine relationships between variables (Creswell & Creswell, 2018). The population comprised parents of children aged 5 to 6 years attending private kindergartens in Kota Kinabalu, Malaysia, who had experience with digital devices. Using purposive sampling (Etikan et al., 2016), 80 parents completed questionnaires on device use, and 7 teachers rated these same 80 children's language abilities. This sample of 80 was sufficient for

a preliminary quantitative study using descriptive statistics and Pearson correlation. Though localized and limited in generalizability, the sample provides valuable local empirical evidence for future, larger-scale research.

The study utilized two instruments: a parent questionnaire and a teacher rating scale. The parent questionnaire measured children's digital device use across two sections: Section A (demographics) and Section B (5 items covering device types, content, duration, frequency, and timing). The teacher rating scale assessed the language development of the 80 children across three sections: Section A (teacher and student information), Section B (7 listening items evaluating sound identification, story listening, and instruction following), and Section C (9 speaking items evaluating sentence use, expressing needs/feelings, and conveying ideas). Mean scores for both instruments were interpreted as low (1.00–2.00), moderate (2.00–3.00), or high (3.00–4.00).

Content validity was evaluated by five experts (three early childhood education lecturers, one educational measurement specialist, and one preschool principal). The instruments achieved a Scale-Level Content Validity Index (S-CVI/Ave) of 0.95, indicating excellent validity. Internal consistency was analyzed using Cronbach's alpha coefficient (Tavakol & Dennick, 2011), demonstrating good to excellent reliability across all domains indicated in Table 1:

Table 1 Cronbach Alpha Value of Instrument

Construct/Domain	Numbers of Items	Cronbach's Alpha
Digital Device Use	5	0.84
Listening Skills	7	0.92
Speaking Skills	9	0.90
Overall Language Development	16	0.93

Following institutional approval from the private kindergartens, teacher rating scales were distributed to class teachers. Concurrently, the parent questionnaire was administered via Google Forms through parents' WhatsApp groups. Data collection spanned three weeks; participation was voluntary, confidential, and anonymous.Completed data were screened, coded, and analyzed using SPSS (version 30). Descriptive statistics (frequencies, percentages, means, and standard deviations) characterized the levels of device use and language development. Pearson correlation analysis ($p < .05$) was executed to determine the strength and direction of the relationship between these two quantitative variables.

FINDINGS

Level of Digital Device Use Among Preschool Children Aged 5 to 6 Years

The first objective of this study was to identify the level of digital device use among preschool children aged 5 to 6 years. The analysis examined several aspects of digital device use, including types of digital devices used, types of applications or content accessed, duration of use, frequency of use, and time of use. Overall, the findings showed that the level of digital device use among the children was moderate (M = 2.50, SD = 0.342).

Types of Digital Devices Used

Table 2 shows the types of digital devices used, the overall mean score was at a moderate level (M = 2.70, SD = 0.40). Television recorded the highest mean score (M = 3.10, SD = 0.467),

indicating a high level of use. In contrast, computer use recorded the lowest mean score (M = 2.42, SD = 0.839), indicating a moderate level of use.

Table 2 Level of Digital Device Use Among Children by Types of Digital Devices Used

Item	Mean	Standard Deviation	Level
Television	3.10	0.467	High
Phone	2.76	0.716	Moderate
Tablet/iPad	2.54	0.728	Moderate
Computer	2.42	0.839	Moderate
Overall	**2.70**	**0.40**	**Moderate**

Types of Applications/Content Used

As presented in Table 3, in terms of applications or content accessed, the overall mean score was high (M = 3.00, SD = 0.414). Educational applications recorded the highest mean score (M = 3.64, SD = 0.484), while games recorded a lower mean score (M = 2.64, SD = 0.917). This indicates that educational content was the most frequently accessed type of digital content among the children in this study.

Table 3 Level of Digital Device Use by Types of Applications/Content Used

Item	Mean	Standard Deviation	Level
Cartoons	2.93	0.612	Moderate
Education	3.64	0.484	High
Sports	2.84	0.849	Moderate
Games	2.64	0.917	Moderate
Songs	2.99	0.684	Moderate
Overall	**3.00**	**0.414**	**High**

Duration

For duration of digital device use, Table 4 shows the overall mean score was moderate (M = 2.15, SD = 0.426). The highest mean score was recorded for one-hour use (M = 2.94, SD = 0.752), while three hours and above recorded the lowest mean score (M = 1.36, SD = 0.611). This suggests that most children in the study did not report very prolonged digital device use.

Table 4 Level of Digital Device Use by Duration

Item	Mean	Standard Deviation	Level
Less than 1 hour	2.69	0.851	Moderate
One hour	2.94	0.752	Moderate
Two hours and above	1.60	0.722	Low
Three hours and above	1.36	0.611	Low
Overall	**2.15**	**0.426**	**Moderate**

Frequency and Time of Digital Device Use

Table 5 presents the frequency of digital device use, which was also at a moderate level (M = 2.55, SD = 0.471). The highest mean score was recorded during weekends (M = 3.33, SD = 0.612), followed by school holidays (M = 3.00, SD = 0.503). For time of use, the overall mean score was moderate (M = 2.01, SD = 0.388), with the highest mean score recorded in the afternoon (M = 2.69, SD = 0.756).

Table 5 Level of Digital Device Use by Frequency of Usage Days

Item	Mean	Standard Deviation	Level
Every Day	1.85	0.858	Low
Weekend	3.33	0.612	High
School Day	1.67	0.792	Low
School Holiday	3.00	0.503	High
Public Holiday	2.90	0.518	Moderate
Overall	**2.55**	**0.471**	**Moderate**

As presented in Table 6, afternoon recorded the highest level of digital device use (M = 2.69, SD = 0.756), whereas midnight showed the lowest mean score (M = 1.15, SD = 0.453). Overall, children's digital device use by time of day remained at a moderate level.

Table 6 Level of Digital Device Use by Time of Use

Item	Mean	Standard Deviation	Level
Morning	2.06	0.801	Moderate
Midday	2.21	0.758	Moderate
Afternoon	2.69	0.756	Moderate
Night	1.94	0.769	Low
Midnight	1.15	0.453	Low
Overall	**2.01**	**0.388**	**Moderate**

Level of Language Development Among Preschool Children Aged 5 To 6 Years

The second objective of this study was to determine the level of language development among preschool children aged 5 to 6 years. Language development was assessed based on two domains, namely listening skills and speaking skills.

Table 7 shows that the children's listening skills were at a good level (M = 3.80, SD = 0.37). The highest mean score was recorded for the item "Students can identify sounds in the environment" (M = 3.84, SD = 0.404), while the lowest mean score was recorded for the item "Students can listen and respond to stories heard" (M = 3.70, SD = 0.560). Overall, the results indicate that the children demonstrated good listening ability.

Table 7 Listening Level

Item	Mean	Standard Deviation	Level
Students can identify sounds in the environment.	3.84	0.404	Good
Students can recognize and distinguish sounds in the environment.	3.83	0.414	Good
Students can respond to sounds heard.	3.80	0.433	Good
Students can listen to stories presented.	3.75	0.516	Good
Students can listen and respond to stories heard.	3.70	0.560	Good
Students can listen and respond politely to morning greetings.	3.81	0.506	Good
Students can respond to simple instructions.	3.83	0.497	Good
Listening Category	**3.80**	**0.37**	**Good**

In Table 8, the children's speaking skills were also rated at a good level (M = 3.41, SD = 0.659). The highest mean score was recorded for the item "Students can say simple sentences politely" (M = 3.76, SD = 0.509), while the lowest mean score was recorded for the item "Students can convey ideas about something heard and seen" (M = 3.17, SD = 0.991). This suggests that although the children generally demonstrated good speaking skills, some aspects involving idea expression may require further support.

Table 8 Speaking Level

Item	Mean	Standard Deviation	Level
Students can say simple sentences politely.	3.76	0.509	Good
Students can interact using simple sentences to state requests.	3.71	0.556	Good
Students can interact using simple sentences to give instructions.	3.33	0.952	Good
Students can interact using simple sentences to give views.	3.25	0.961	Good
Students can interact using simple sentences to express feelings.	3.43	0.792	Good
Students can engage in Q&A using simple sentences.	3.45	0.727	Good
Students can engage in Q&A using simple sentences based on stimulus materials.	3.43	0.759	Good
Students can convey ideas about something heard and seen.	3.17	0.991	Good
Students can convey ideas critically about something seen and heard.	3.18	1.016	Good
Speaking Category	**3.41**	**0.659**	**Good**

Relationship Between Digital Device Use and Language Development of Children Aged 5 To 6 Years

The third objective of this study was to examine the relationship between digital device use and language development among preschool children aged 5 to 6 years. Pearson correlation analysis was conducted to determine the strength and direction of the relationship between the two variables.

Table 9 shows a very weak positive relationship between digital device use and language development (r = .097). However, the relationship was not statistically significant (p = .394). Therefore, the findings indicate that digital device use was not significantly related to language development among the preschool children in this study.

Table 9 Relationship between Digital Device Use and Children's Language Development

Correlations		**Digital Device Use**	**Language Development**
Digital Device Use	Pearson Correlation	1	.097
	Sig. (2-tailed)		.394
	N	80	80
Language Development	Pearson Correlation	.097	1
	Sig. (2-tailed)	.394	
	N	80	80

DISCUSSION

The findings of this study showed that preschool children aged 5 to 6 years demonstrated a moderate level of digital device use and a good level of language development in both listening and speaking domains. Pearson correlation analysis further revealed a very weak and non-significant relationship between digital device use and language development. This finding indicates that digital device use, as measured in this study, was not significantly associated with children's listening and speaking development.

Therefore, the result should be interpreted cautiously and should not be taken to mean that digital device use has no developmental implications. Rather, it suggests that the relationship between digital device use and language development may depend on how digital devices are used, the type of content accessed, the duration of use, and the broader interactional context surrounding children's daily experiences.

The moderate level of digital device use found in this study suggests that the children were exposed to digital devices, but not necessarily at excessive levels. This may help explain why digital device use was not significantly related to language development in the present sample. Previous studies have reported that excessive screen time, especially among toddlers and preschool children, may be associated with poorer developmental and language outcomes (Madigan et al., 2019; Madigan et al., 2020; Karani et al., 2022). Similarly, studies have shown that prolonged and frequent screen exposure may reduce opportunities for active communication, social interaction, and parent–child verbal engagement, which are important for language acquisition (Sundqvist et al., 2021; Mustonen et al., 2022). In contrast, the present study found a non-significant association, possibly because the children's overall digital device use was moderate rather than excessive.

The findings also showed that educational applications were among the most frequently accessed types of digital content. This may suggest that some children in the study used digital

devices for learning-related purposes. However, this interpretation must be made carefully because the present study did not directly assess the quality, interactivity, or pedagogical value of the content accessed. Previous research has emphasized that digital device use does not have a uniform effect on children's development. Passive entertainment-based screen use may be less beneficial, whereas high-quality educational and interactive digital content may support vocabulary learning, listening comprehension, and early literacy when used appropriately (Nobre et al., 2019; Neumann, 2020; Liu et al., 2024). Therefore, the non-significant relationship in this study may indicate that duration of use alone is insufficient to explain language development outcomes.

The good level of listening and speaking skills among the children suggests that they were generally able to respond to sounds, follow simple instructions, use simple sentences, express needs, and participate in classroom communication. This finding is consistent with the view that language development at the age of 5 to 6 years is strongly supported by social interaction, classroom communication, and meaningful engagement with adults and peers (Ali & Mokhtar, 2026). However, the language development measure in this study focused mainly on listening and speaking skills. Other aspects of language development, such as vocabulary depth, narrative ability, pragmatic language, phonological awareness, and early literacy, were not measured. Therefore, the good level of language development reported in this study should be understood within the scope of the measured domains only.

The finding of a very weak and non-significant relationship also supports the argument that digital device use should not be understood only in terms of access or exposure. The literature suggests that the relationship between digital device use and language development is influenced by several contextual factors, including adult mediation, content quality, interactivity, family routines, and the availability of language-rich interaction (Karani et al., 2022; Nwachukwu et al., 2025). Nevertheless, since parental involvement, home literacy environment, socioeconomic status, and parental digital literacy were not directly measured in the present study, these factors cannot be treated as explanatory findings. Instead, they should be considered as possible contextual variables that future studies may examine to provide a more comprehensive understanding of the relationship between digital device use and language development.

The findings have practical implications for parents and early childhood educators. Rather than focusing only on limiting digital device use, parents and teachers should also consider the purpose, content, and context of children's digital engagement. Guided and age-appropriate digital device use may provide learning opportunities, especially when children are exposed to educational applications and interactive media. At the same time, digital device use should not replace face-to-face communication, shared reading, peer interaction, and adult–child conversation, as these remain central to early language development. Therefore, balanced digital use, active adult guidance, and meaningful language interaction should be encouraged in children's daily routines.

Overall, this study contributes local evidence on the relationship between digital device use and language development among preschool children aged 5 to 6 years. The non-significant relationship found in this study suggests that digital device use alone may not be a direct predictor of listening and speaking development among the children in this sample. However, the finding should be interpreted within the limitations of the study, particularly its cross-sectional design, relatively small and localised sample, and limited measurement of language development domains. Future research should include larger and more diverse samples, longitudinal designs, and additional contextual variables such as parental mediation, home literacy environment, socioeconomic background, and content quality.

CONCLUSION

In conclusion, this study examined the relationship between digital device use and language development among preschool children aged 5 to 6 years. The findings showed that children's digital device use was at a moderate level, while their language development, particularly in listening and speaking skills, was rated at a good level. The correlation analysis indicated a very weak and non-significant relationship between digital device use and language development. Therefore, digital device use, as measured in this study, was not significantly associated with children's listening and speaking development.

These findings suggest that digital device use alone may not directly explain language development outcomes among the preschool children in this sample. However, this conclusion should be interpreted carefully because the study focused only on selected aspects of digital device use and two domains of language development. Other contextual factors, such as content quality, parental mediation, home literacy environment, socioeconomic background, and opportunities for social interaction, were not directly measured in this study. Therefore, these factors should be examined in future research rather than treated as explanatory findings of the present study.

From a practical perspective, the findings highlight the importance of balanced, guided, and age-appropriate digital device use among preschool children. Parents and early childhood educators should ensure that digital device use does not replace face-to-face communication, shared reading, peer interaction, and meaningful language activities. Future studies are recommended to involve larger and more diverse samples, adopt longitudinal designs, and include additional contextual variables to better understand how digital device use relates to early language development.

Co-Author Contribution

The authors declare no conflict of interest. Rowency Suntek and Juppri Bacotang conducted fieldwork, prepared the literature review, and oversaw the writing. Rashidin Idris, Fariha Diyana Awang Ali and Ahmad Salahuddin M. Azizan handled the research methodology and data entry. Khairul Firdaus Ne'matullah, Aan Listiana and Erna Risnawati performed statistical analysis and interpreted the results.

Ethics Statement

This study was conducted following ethical guidelines. Informed consent was obtained from all participants. Participation was voluntary, and confidentiality was ensured.

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