

The Influence of Gadget Use on Learning Performance Among Autistic Children

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ABSTRACT

This quantitative correlational study examined the relationship between gadget use and learning performance among autistic children in Johor Bahru, Malaysia. With a reported increase in autism diagnoses and the growing integration of technology in education, understanding the impact of gadgets on autistic learners is essential. The study investigated three dimensions of gadget use: duration, types of devices, and purposes of use in educational and therapeutic settings. A cross-sectional survey design was employed involving 104 respondents comprising parents, teachers, and therapists working with autistic children. Data were collected using a structured questionnaire distributed through Google Forms and analyzed using Statistical Package for the Social Sciences (SPSS). Descriptive statistics, reliability analysis, and correlation analysis were conducted. The findings revealed that the majority of respondents allowed autistic children to use gadgets, indicating widespread acceptance of technology as a learning tool. Correlation analysis demonstrated significant relationships between gadget use variables and autistic children's learning performance ($p = .001$). Reliability testing showed satisfactory reliability for gadget use variables (Cronbach's Alpha = 0.766), while learning performance demonstrated moderate reliability (Cronbach's Alpha = 0.636). The results suggest that gadget use can positively support learning when appropriately managed with consideration given to screen time, device selection, and educational purpose. However, excessive and unregulated usage may pose developmental and behavioral concerns. This study contributes local evidence regarding technology use among autistic children and offers practical implications for educators, therapists, parents, and policymakers in Malaysia.

Keywords: Autism Spectrum Disorder (ASD), gadget use, learning performance, educational technology, special education

INTRODUCTION

Research Background

Digital technology has become an integral part of everyday life, influencing the way people communicate, work, and learn. The widespread use of smartphones, tablets, laptops, and other digital devices has also changed educational practices, creating new opportunities for teaching and learning. For children with special educational needs, these technologies can provide alternative ways to access information, participate in learning activities, and develop essential skills (Lopez-Diaz et al., 2024). In special education, digital tools have increasingly been used to support the learning needs of children with Autism Spectrum Disorder (ASD). Educational applications, interactive software, and communication technologies can help autistic children engage more effectively in learning activities while supporting the development of communication and social skills. Previous studies have shown that technology can enhance learning experiences and contribute

positively to the academic and social development of children with ASD (Costescu et al., 2024; Lopez-Diaz et al., 2024).

Autism Spectrum Disorder is a neurodevelopmental condition that affects communication, social interaction, and behaviour. Children with ASD often experience challenges in social communication and may display restricted or repetitive patterns of behaviour. The characteristics and severity of autism vary from one individual to another, requiring educational approaches that are flexible and responsive to individual learning needs (Shair et al., 2024). The number of children diagnosed with ASD has increased worldwide over the past decade. In Malaysia, the prevalence of autism among school-age children increased from 6.34 per 1,000 children in 2018 to 9.29 per 1,000 children in 2022 (Shair et al., 2024). In addition, the National Autism Society of Malaysia (NASOM) reported a 30% increase in the number of autistic children requiring therapy services in 2024, highlighting the growing need for effective educational and intervention strategies.

As the number of autistic children continues to rise, educators and parents are exploring ways to improve learning outcomes and provide meaningful educational support. Technology-based learning has attracted considerable attention because of its potential to increase student engagement, facilitate communication, and support cognitive development. Research has also suggested that technology can improve the quality of life of autistic children, particularly when it is used to promote social interaction and communication (Costescu et al., 2024). Within the Malaysian educational context, the adoption of technology in special education has been encouraged as a means of supporting inclusive teaching practices and improving learning experiences for children with ASD. Teachers increasingly recognize the value of digital technologies in addressing the diverse needs of autistic learners and creating more engaging learning environments (Khan et al., 2021).

Given the growing reliance on digital devices in both educational and home settings, it is important to understand how gadget use influences the learning performance of autistic children. Examining this relationship may provide valuable insights for educators, parents, and policymakers in developing effective strategies to support the educational development of children with ASD. The increasing availability of digital devices has led to greater gadget use among children, including those with Autism Spectrum Disorder (ASD). In educational and therapeutic settings, gadgets such as tablets, smartphones, and computers are frequently used to support learning, communication, and social interaction. Research has shown that technology-based interventions can enhance engagement, communication skills, and academic performance among autistic children when used appropriately (Lopez-Diaz et al., 2024 ; Khan et al., 2021).

Regardless of these potential benefits, concerns have also been raised regarding the negative effects of excessive gadget use. Studies have reported that prolonged screen time may contribute to behavioural difficulties, reduced social interaction, sleep disturbances, and dependence on digital devices, which may affect children's overall development and well-being (Costescu et al., 2024). As a result, the impact of gadget use on autistic children's learning performance remains inconclusive, with previous research reporting mixed findings.

In Malaysia, the number of children diagnosed with ASD continues to increase, creating a greater need for effective educational strategies and interventions (Shair et al., 2024). At the same time, parents, teachers, and therapists are increasingly incorporating digital technologies into learning and therapeutic activities to support autistic children. However, there is limited local evidence on how different patterns of gadget use, such as the duration of use, type of device used, and purpose of use, influence learning performance among autistic children. Research focusing on the Malaysian context remains relatively scarce, particularly at the school and community levels (Khan et al., 2021).

Furthermore, while inclusive and supportive educational approaches are essential for learners with special educational needs, understanding the role of technology in facilitating learning outcomes is becoming increasingly important (Norul Huda, 2024). The lack of empirical evidence regarding the relationship between gadget use and learning performance makes it difficult for educators, parents, and policymakers to determine the most appropriate use of digital devices for autistic children. Therefore, this study seeks to investigate the influence of gadget use on the learning performance of autistic children in Johor Bahru, with particular

emphasis on the duration, type, and purpose of gadget use. The findings are expected to provide useful insights for educators, parents, therapists, and relevant stakeholders in supporting the educational development of children with ASD.

Research Gap

Although previous studies have examined the use of technology among children with Autism Spectrum Disorder (ASD), much of the existing research has been conducted in Western countries, where educational systems, technology accessibility, and cultural practices may differ from those in Malaysia (Costescu et al., 2024; Lopez-Diaz et al., 2024). Consequently, the findings from these studies may not be fully applicable to the Malaysian context, particularly in understanding how gadget use influences the learning experiences of autistic children. Furthermore, existing studies have primarily focused on the general benefits or challenges of technology use among children with ASD. While technology has been associated with improvements in communication, engagement, and academic performance, the potential negative effects of excessive screen exposure have also been reported (Costescu et al., 2024; Lopez-Diaz et al., 2024). However, relatively few studies have examined multiple dimensions of gadget use simultaneously, such as duration of use, type of device, and purpose of use, and how these factors collectively influence learning performance among autistic children.

In the Malaysian context, research on technology adoption for children with ASD has largely focused on educators' acceptance and use of technology rather than its direct impact on children's learning outcomes (Khan et al., 2021). Furthermore, studies on autism education in Malaysia have highlighted the challenges faced by educators in implementing effective inclusive practices, including limited resources, training, and institutional support (Krishnan & Jamela, 2025). At the same time, the prevalence of ASD in Malaysia continues to increase, creating a greater need for evidence-based educational interventions that can support autistic children's learning and development (Shair et al., 2024). Moreover, there is limited empirical evidence specifically examining the relationship between gadget use and learning performance among autistic children in Johor Bahru. Despite the growing reliance on digital devices by parents, teachers, and therapists, little is known about whether gadget use contributes positively or negatively to educational outcomes in this local setting. Understanding this relationship is essential for supporting inclusive educational practices and ensuring that technology is used effectively to enhance learning among children with special educational needs (Norul Huda, 2024).

Therefore, this study seeks to address these gaps by investigating the relationship between gadget use and learning performance among autistic children in Johor Bahru. Specifically, the study examines the influence of gadget-use duration, device type, and purpose of use on learning performance. The findings are expected to provide context-specific evidence that can assist educators, parents, therapists, and policymakers in making informed decisions regarding the use of digital technology to support autistic children's learning and development.

Significance of the Study

This study contributes to the growing body of knowledge on technology-assisted learning among autistic children by providing empirical evidence from the Malaysian context. The findings may help educators, parents, therapists, and policymakers better understand the influence of gadget use on the learning performance of autistic children. As technology is increasingly utilized to support teaching, learning, and communication among children with Autism Spectrum Disorder (ASD), understanding its impact is essential for promoting effective educational practices (Khan et al., 2021; Lopez-Diaz et al., 2024). The findings may assist educators in integrating technology more effectively into learning activities, guide parents in managing screen time and selecting appropriate digital resources, and support therapists in incorporating technology into intervention programmes. Furthermore, the study may provide valuable evidence for policymakers in developing strategies and guidelines that promote inclusive education, responsible technology use, and improved learning outcomes for children with special educational needs (Norul Huda, 2024; Krishnan & Jamela, 2025).

Research Objectives

- i. To investigate the relationship between the duration of gadget use and autistic children's learning performance.
- ii. To determine whether different types of gadgets affect autistic children's learning performance.
- iii. To analyze how the purpose of gadget use affects autistic children's learning performance.

Research Questions

This study seeks to answer the following research questions:

- i. RQ1: What is the relationship between the duration of gadget use and autistic children's learning performance in Johor Bahru?
- ii. RQ2: How do different types of gadgets affect autistic children's learning performance in Johor Bahru?
- iii. RQ3: How does the purpose of gadget use affect autistic children's learning performance in Johor Bahru?

LITERATURE REVIEW

Autistic Children's Learning Performance

Learning performance among autistic children varies according to their individual strengths, abilities, and learning needs. Contemporary educational approaches emphasize strength-based learning, which focuses on developing existing competencies while providing appropriate support for areas of difficulty. Research has shown that technology-assisted interventions can improve academic performance, communication skills, attention, emotional regulation, and social interaction among children with Autism Spectrum Disorder (ASD) (Lopez-Diaz et al., 2024; Xu et al., 2024). Furthermore, augmented reality and other interactive digital tools have been found to enhance language acquisition, reading comprehension, and cognitive development by creating engaging and individualized learning experiences for autistic learners (Fuentes et al., 2025; El Shemy et al., 2024). These findings suggest that educational outcomes among autistic children can be enhanced through appropriate instructional strategies and supportive learning environments.

Duration of Gadget Use

The duration of gadget use has become a growing concern among researchers, educators, and healthcare professionals due to its potential impact on children's development and learning. While digital devices offer educational benefits, prolonged screen exposure may lead to behavioural problems, reduced social interaction, sleep disturbances, and increased dependence on technology among children with ASD (Ophir et al., 2023; Lima et al., 2025). Existing studies indicate that excessive screen time may negatively affect cognitive and psychosocial development, although findings remain inconclusive due to variations in study designs and measurement approaches (Ophir et al., 2023). Nevertheless, moderate and supervised gadget use can provide educational opportunities and support learning engagement when integrated appropriately into daily activities and learning programmes (Costescu et al., 2024).

Types of Gadget Use

Various types of gadgets, including smartphones, tablets, laptops, and desktop computers, are commonly used by autistic children for educational, communication, and recreational purposes. Mobile technologies are particularly popular because of their portability, accessibility, and interactive features. Research has demonstrated that digital interventions delivered through mobile devices and computers can improve

communication, social-emotional skills, cognitive development, and learning engagement among children with ASD (Xu et al., 2024; Lopez-Diaz et al., 2024). Similarly, Khan et al. (2021) reported that educators increasingly recognize the value of technological tools in supporting teaching and learning for autistic children. The effectiveness of these devices depends largely on how they are utilized and whether they are aligned with the learning needs of the child.

Purpose of Gadget Use

The purpose of gadget use plays a significant role in determining its impact on autistic children's learning and development. Studies suggest that educational and therapeutic applications of technology can promote communication skills, social interaction, emotional regulation, cognitive development, and academic achievement among children with ASD (Lopez-Diaz et al., 2024; Fuentes et al., 2025). Technology used for structured learning activities has been associated with improved engagement and positive educational outcomes, whereas unregulated use primarily for entertainment may not provide the same benefits (Costescu et al., 2024). In the Malaysian context, researchers have emphasized the importance of evidence-based educational practices and adequate support systems to ensure that technology is used meaningfully to support learners with special educational needs (Norul Huda, 2024; Krishnan & Jamela, 2025). Therefore, the educational value of gadgets depends not only on access to technology but also on the purpose for which the devices are used.

METHODOLOGY

Research Design

This study adopted a quantitative correlational research design using a cross-sectional survey method to investigate the relationship between gadget use and learning performance among autistic children in Johor Bahru. A quantitative approach was appropriate because it enabled the collection and analysis of numerical data from a relatively large group of respondents. The correlational design was selected to examine the relationships between the independent variables, namely the duration of gadget use, types of gadgets used, and purposes of gadget use, and the dependent variable, autistic children's learning performance. Since the data were collected at a single point in time, a cross-sectional approach was employed to provide a snapshot of respondents' perceptions and experiences regarding gadget use among autistic children (Creswell & Creswell, 2018).

Participants and Sample

The participants in this study consisted of parents, teachers, and therapists who had direct experience interacting with autistic children in Johor Bahru, Malaysia. These individuals were selected because they are closely involved in the children's daily learning activities and are familiar with their patterns of gadget use. A total of 104 respondents participated in the study, representing different demographic backgrounds and professional roles. Convenience sampling was used to recruit respondents who were readily available and willing to participate. This sampling method is frequently used in educational and social science research when access to a specific population is limited (Etikan et al., 2016).

Instruments and Materials

Data were collected using a structured questionnaire developed based on the study objectives, previous literature, and established constructs related to technology use among autistic children (Khan et al., 2021; López-Díaz et al., 2024). The questionnaire comprised five sections: demographic information, duration of gadget use, types of gadgets used, purposes of gadget use, and autistic children's learning performance. All responses were measured using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), a widely used scale for measuring attitudes and perceptions in survey research (Joshi et al., 2015).

Data Collection Procedure

Data collection was conducted over approximately two weeks using an online survey through Google

Forms. The survey link was distributed to eligible parents, teachers, and therapists in Johor Bahru through various communication channels. Before participating, respondents were informed about the purpose of the study and assured that their responses would remain confidential and anonymous. Participation was entirely voluntary, and respondents were free to decide whether to complete the questionnaire. Online surveys have become an effective method for collecting data from geographically dispersed respondents while ensuring efficiency in data management (Creswell & Creswell, 2018).

Data Analysis

The collected data were analysed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarise respondents' demographic information and gadget-use patterns. A normality test was conducted to verify whether the data met the assumptions required for parametric analysis. Reliability analysis using Cronbach's Alpha was performed to assess the internal consistency of the questionnaire items. Pearson correlation analysis was subsequently employed to determine the strength and direction of the relationships between gadget-use variables and autistic children's learning performance. These statistical procedures are commonly used in behavioural and educational research to examine relationships among variables (Hair et al., 2019).

Validity and Reliability

The reliability of the questionnaire was assessed using Cronbach's Alpha coefficient. The learning performance construct recorded a Cronbach's Alpha value of 0.636, indicating moderate reliability, while the gadget-use construct achieved a value of 0.766, demonstrating acceptable internal consistency. According to Hair et al. (2019), Cronbach's Alpha values above 0.60 are generally considered acceptable for exploratory research. In addition, the normality analysis showed that the data were distributed close to the diagonal line, indicating that the normality assumption required for Pearson correlation analysis was met.

Ethical Considerations

Ethical principles were observed throughout the study to protect the rights and welfare of participants. Respondents were provided with clear information regarding the purpose of the research and were informed that participation was entirely voluntary. Confidentiality and anonymity were maintained by ensuring that no personally identifiable information was collected or disclosed. The data were used solely for academic purposes, and respondents were informed of their right to withdraw from the study at any stage without penalty. Adhering to ethical research practices helps ensure the credibility, integrity, and trustworthiness of the research findings (Creswell & Creswell, 2018).

Research Design

This study employed a quantitative correlational research design using a cross-sectional survey approach to examine the influence of gadget use on the learning performance of autistic children in Johor Bahru. A quantitative approach was chosen because it allows researchers to collect numerical data and statistically analyse the relationships between variables. According to Creswell and Creswell (2023), quantitative research is appropriate when the objective is to measure variables and determine the nature of their relationships.

The study focused on three independent variables: duration of gadget use, types of gadgets used, and purpose of gadget use. These variables were examined in relation to the dependent variable, which is the learning performance of autistic children. A correlational design was considered suitable because the study aimed to explore whether a relationship exists between gadget-use factors and learning performance without manipulating any variables. Rather than establishing a cause-and-effect relationship, the research sought to

determine the strength and direction of the associations among the variables being studied. This characteristic aligns with the purpose of correlational research as described by Creswell and Creswell (2023).

In addition, a cross-sectional survey was used because data were collected from respondents at a single point in time through a structured questionnaire. Cross-sectional studies are useful for providing a snapshot of a population and examining relationships among variables within a specific period. They are also widely recognised as practical, time-efficient, and cost-effective methods for data collection. The questionnaire was distributed to parents, teachers, and therapists who regularly interact with autistic children and are therefore able to provide reliable information regarding the children's gadget-use habits and learning performance. The survey method enabled the researcher to gather data from a relatively large number of respondents within a limited timeframe, making it an effective approach for achieving the objectives of the study.

Overall, the quantitative correlational cross-sectional survey design was considered the most appropriate method for investigating the relationship between gadget use and learning performance among autistic children in Johor Bahru.

Participants and Sampling

Population

The target population of this study comprised parents, teachers, and therapists who work with autistic children in Johor Bahru, Malaysia. These individuals were selected because they are directly involved in the children's educational, developmental, and therapeutic processes and are therefore well-positioned to provide accurate information regarding gadget use and learning performance among autistic children.

Sample Size

A total of 104 respondents participated in the study. The sample consisted of parents, teachers, and therapists who had experience interacting with autistic children and observing their learning behaviours and technology usage patterns. This sample size was considered adequate for conducting descriptive and correlational statistical analyses using SPSS.

Sampling Technique

This study employed convenience sampling, a non-probability sampling technique in which participants were selected based on accessibility and willingness to participate in the research. The technique was appropriate because it enabled the researcher to reach respondents who had direct experience with autistic children within the specified study period. Furthermore, convenience sampling facilitated efficient data collection from a targeted group of respondents across various educational and therapeutic settings in Johor Bahru.

Inclusion and Exclusion Criteria

The inclusion criteria for this study were:

- i. Parents, teachers, or therapists who work directly with autistic children.
- ii. Respondents aged 18 years and above.
- iii. Individuals residing or working in Johor Bahru.
- iv. Individuals who were willing to participate voluntarily and complete the questionnaire.
- v. Individuals with sufficient knowledge of the autistic child's gadget usage and learning performance.

The exclusion criteria were:

- i. Individuals who do not have direct experience with autistic children.
- ii. Respondents who did not complete the questionnaire.
- iii. Individuals residing outside the study area.
- iv. Responses with incomplete or invalid data that could affect the accuracy of the analysis.

Study Setting

The study was conducted in Johor Bahru, Johor, Malaysia. Data were collected through an online questionnaire distributed via Google Forms to parents, teachers, and therapists within the study area. Johor Bahru was selected as the study setting due to the increasing prevalence of Autism Spectrum Disorder (ASD) and the growing use of digital technology among children in the region. The setting provided an appropriate context for examining the relationship between gadget use and learning performance among autistic children.

Instrument and Data Collection

Instrument

Data for this study were collected using a structured questionnaire developed to measure the study variables: duration of gadget use, types of gadgets used, purposes of gadget use, and autistic children's learning performance. A questionnaire was selected because it allows researchers to collect standardized data from a large number of respondents efficiently and systematically (Creswell & Creswell, 2023). The questionnaire consisted of two sections. Section A collected demographic information from respondents, including age, gender, and role (parent, teacher, or therapist). This section also gathered general information regarding respondents' perspectives on gadget use among autistic children. Section B contained items measuring the study variables and utilized a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The use of a Likert scale enabled respondents to express the extent of their agreement with each statement and facilitated quantitative analysis of the collected data.

Source and Adaptation of Instrument

The questionnaire was developed based on the objectives of the study and adapted from concepts and constructs identified in previous literature related to gadget use, educational technology, and learning performance among autistic children. The instrument focused on three dimensions of gadget use, namely duration of use, types of gadgets used, and purpose of gadget use, which served as the independent variables. Learning performance served as the dependent variable. Several items were modified to ensure their suitability for the Malaysian context and to reflect the experiences of parents, teachers, and therapists who work closely with autistic children in Johor Bahru. The adaptation process helped ensure that the questionnaire items were relevant, understandable, and aligned with the study objectives.

Validity

Content validity refers to the extent to which an instrument adequately represents the construct it is intended to measure (Creswell & Creswell, 2023). In this study, content validity was established by developing questionnaire items based on relevant literature and aligning them with the research objectives and research questions. Each item was carefully designed to represent the dimensions of gadget use and learning performance. Furthermore, the questionnaire focused on respondents' observations and experiences regarding autistic children's gadget-use patterns and learning outcomes. This ensured that the instrument was appropriate and relevant to the context of the study.

Reliability

The reliability of the questionnaire was assessed using Cronbach's Alpha to determine the internal consistency

of the measurement scales. Cronbach's Alpha is one of the most widely used indicators for evaluating the reliability of research instruments (Hair et al., 2019). The results showed that the gadget-use construct, which included duration, types, and purpose of gadget use, achieved a Cronbach's Alpha coefficient of 0.766, indicating acceptable internal consistency. Meanwhile, the learning performance construct recorded a Cronbach's Alpha value of 0.636, indicating moderate reliability. Although this value was slightly below the commonly recommended threshold of 0.70, it remained acceptable for exploratory studies involving behavioural and educational constructs. Therefore, the reliability analysis demonstrated that the questionnaire was sufficiently reliable for subsequent statistical analyses.

Data Collection Process

Data were collected using Google Forms, which provided a convenient and efficient platform for distributing and managing the questionnaire. The survey link was distributed to parents, teachers, and therapists who met the study criteria and had direct experience working with autistic children. The data collection process was conducted over approximately two weeks. Before completing the questionnaire, participants were informed about the purpose of the study and assured that all information provided would remain confidential and be used solely for academic purposes. Participation was voluntary, and respondents were free to withdraw at any stage of the survey. Upon completion, responses were automatically recorded in the Google Forms database and exported into the Statistical Package for the Social Sciences (SPSS) for further analysis.

Data Analysis

The collected data were analysed using the Statistical Package for the Social Sciences (SPSS). Prior to analysis, the responses obtained through Google Forms were screened and coded to ensure completeness, accuracy, and consistency of the dataset. The analysis was carried out in four stages: demographic analysis, normality analysis, reliability analysis, and correlation analysis. First, descriptive statistics were used to analyse respondents' demographic characteristics, including age, gender, role, and perceptions regarding gadget use among autistic children. Frequencies and percentages were generated to summarise the respondents' profiles and provide an overall description of the sample. Second, a normality analysis was conducted to determine whether the data met the assumptions required for parametric statistical testing. According to Pallant (2020), normality testing is important because many parametric procedures assume that data are approximately normally distributed. The normal probability plot showed that the data points were closely aligned with the diagonal line, suggesting that the data were normally distributed and suitable for further parametric analysis.

Third, reliability analysis was performed using Cronbach's Alpha to assess the internal consistency of the questionnaire items. The learning performance construct recorded a Cronbach's Alpha value of 0.636, indicating moderate reliability, while the gadget-use construct achieved a value of 0.766, indicating acceptable reliability. These findings confirmed that the measurement scales were reliable and appropriate for subsequent statistical testing. Finally, Pearson's correlation analysis was employed to examine the relationships between the independent variables (duration of gadget use, types of gadgets used, and purpose of gadget use) and the dependent variable (autistic children's learning performance). Pearson's correlation is commonly used to measure the strength and direction of relationships between continuous variables (Pallant, 2020). The analysis was conducted at a significance level of $p < 0.05$.

The findings revealed a statistically significant relationship between gadget use and learning performance, with a significance value of 0.001. This result indicates that gadget-use factors were significantly associated with autistic children's learning performance in Johor Bahru. The use of descriptive statistics, normality testing, reliability analysis, and Pearson's correlation analysis enabled the researcher to address the research objectives and determine the relationship between gadget use and learning performance among autistic children.

RESULTS

This chapter presents the findings of the study, specifically a survey on The Influence of Gadget Use on

Learning Performance Among Autistic Children in Johor Bahru, conducted during the project. Four methods of analysis were used to analyse, which are demographic analysis, normality analysis, reliability analysis, and correlation analysis.

Demographic Analysis

Age of Respondents

Table 1. Age Distribution of Respondents

Age Group (Years)	Frequency (n)	Percentage (%)	Cumulative Percentage (%)
20–25	22	21.2	21.2
26–30	34	32.7	53.8
31–35	20	19.2	73.1
36–40	17	16.3	89.4
41–45	11	10.6	100.0
Total	104	100.0	100.0

Table 1 shows the age distribution of the respondents. The largest group was respondents aged 26–30 years (n = 34, 32.7%), followed by those aged 20–25 years (n = 22, 21.2%), 31–35 years (n = 20, 19.2%), and 36–40 years (n = 17, 16.3%). The smallest group comprised respondents aged 41–45 years (n = 11, 10.6%).

According to Table 1, the largest group of respondents was 26–30 years old, comprising 34 respondents (32.7%). This was followed by respondents aged 31–35 years with 20 respondents (19.2%), 36–40 years with 17 respondents (16.3%), and 20–25 years with 22 respondents (21.2%). The smallest age group was 41–45 years, consisting of 11 respondents (10.6%). The findings indicate that the majority of the respondents were young adults between 26 and 30 years of age, suggesting that this age group was the most actively represented in the study. In contrast, respondents aged 41–45 years were the least represented among the participants.

These findings indicate that the majority of respondents were relatively young adults. This suggests that most parents, teachers, and therapists involved in the study belong to the age group that is generally familiar with digital technologies and educational gadgets. Consequently, they are likely to possess sufficient experience and exposure to observe and evaluate autistic children's gadget usage and its influence on learning performance. The representation of different age categories also provides diverse perspectives regarding technology use among autistic children.

Gender of Respondents (N = 104)

Gender	Frequency (n)	Percentage (%)	Cumulative Percentage (%)
Female	76	73.1	73.1
Male	28	26.9	100.0
Total	104	100.0	100.0

According to Table 2, the majority of the respondents were female, with 76 respondents (73.1%), while 28 respondents (26.9%) were male. These findings indicate that female respondents constituted nearly three-quarters of the study sample, whereas male respondents represented approximately one-quarter. Overall, the demographic profile shows that the study was predominantly represented by female participants. If the

respondents were preschool teachers, this distribution reflects the generally higher proportion of females in the early childhood education profession.

Table 3: Role of Respondents (N = 104)

Role	Frequency (n)	Percentage (%)	Cumulative Percentage (%)
Parent	49	47.1	47.1
Teacher	42	40.4	87.5
Therapist	13	12.5	100.0
Total	104	100.0	100.0

According to Table 3, the largest group of respondents consisted of parents, with 49 respondents (47.1%). This was followed by teachers, who accounted for 42 respondents (40.4%), while therapists represented the smallest group, with 13 respondents (12.5%). Overall, the findings indicate that parents formed the largest proportion of the study sample, followed closely by teachers. The inclusion of respondents from different roles provides a range of perspectives on the research topic, with parents contributing the highest proportion of responses and therapists representing a smaller but important segment of the participants.

Table 4: Respondents Who Allow Children to Use Gadgets (N = 104)

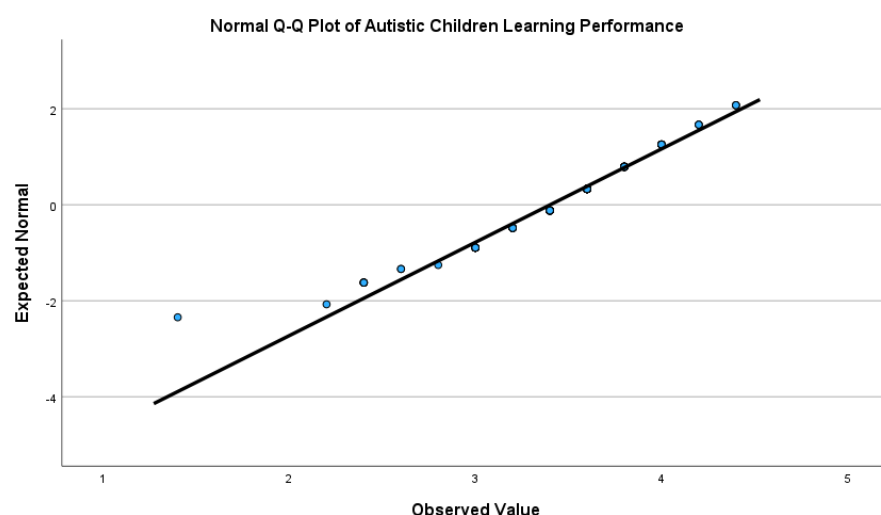
Response	Frequency (n)	Percentage (%)	Cumulative Percentage (%)
No	45	43.3	43.3
Yes	59	56.7	100.0
Total	104	100.0	100.0

According to Table 4.4, 59 respondents (56.7%) reported that they allow children to use gadgets, while 45 respondents (43.3%) indicated that they do not allow children to use gadgets.

The findings reveal that a slightly higher proportion of respondents allow children to use gadgets than those who do not. Specifically, more than half of the respondents reported permitting children to use digital devices, while a substantial proportion preferred not to allow gadget use. This demographic information provides an overview of respondents' practices regarding children's access to gadgets and serves as a basis for the subsequent analysis of gadget use and its relationship with the variables investigated in this study.

Normality Analysis

Figure 1



According to Figure 1 the data points are distributed closely along the diagonal reference line in the Normal Q-Q Plot, with only slight deviations observed at the lower and upper ends of the distribution. This pattern indicates that the observed data are approximately normally distributed. The findings suggest that the assumption of normality has been satisfied for the autistic children's learning performance scores. Therefore, the data are considered suitable for subsequent parametric statistical analyses.

Reliability Analysis

Table 5: Autistic Children's Learning Performance

Cronbach's Alpha	N of Items
0.434	5

Table 5: Autistic Children's Learning Performance

Table 5 presents the reliability analysis for the construct Autistic Children's Learning Performance. The Cronbach's Alpha coefficient obtained was 0.434 for the five items used in the scale. This value is below the recommended threshold of 0.70, indicating poor internal consistency reliability. Therefore, the items may not adequately measure the same underlying construct, and revision or removal of problematic items should be considered to improve the reliability of the instrument.

Table 6 : Duration, types, and purpose of the gadget use

Cronbach's Alpha	N of Items
0.766	4

Table 6 : Duration, types, and purpose of the gadget use

Table 6 demonstrates the reliability analysis for the construct Duration, Types, and Purpose of Gadget Use. The Cronbach's Alpha coefficient was 0.766 for the four items included in the scale. This value is above the acceptable threshold of 0.70, indicating good internal consistency among the items. Therefore, the items used to measure this construct are reliable and suitable for further analysis.

Colleration Analysis

Table 7 : shows the Pearson correlation analysis between the duration of gadget usage and autistic children's learning performance.

Correlations				
		Descriptive Statistics		
		Mean	Std. Deviation	N
Autistic Children Learning Performance		3.4019	0.51426	104
Duration of Gadget Usage		3.2356	0.85957	104
		Correlations		
			Autistic Children Learning Performance	Duration of Gadget Usage
Autistic Children Learning Performance	Pearson Correlation		1	0.175
	Sig. (2-tailed)			0.076
	N		104	104
Duration of Gadget Usage	Pearson Correlation		0.175	1
	Sig. (2-tailed)		0.076	
	N		104	104

Table 7 Descriptive Analysis

Variable	Mean	Standard Deviation	N
Autistic Children Learning Performance	3.4019	0.51426	104
Duration of Gadget Usage	3.2356	0.85957	104

Table 7 shows the Pearson correlation analysis between the duration of gadget usage and autistic children's learning performance. The results revealed a weak positive correlation between the two variables ($r = 0.175$). However, the significance value was 0.076, which is greater than the 0.05 level of significance. Therefore, the relationship between duration of gadget usage and autistic children's learning performance is not statistically significant. This finding suggests that the duration of gadget usage does not have a significant association with autistic children's learning performance among the respondents in this study.

Table 8: Correlation Between Duration of Gadget Usage and Autistic Children Learning Performance

Variable	1	2
1. Autistic Children Learning Performance	1.000	0.175
2. Duration of Gadget Usage	0.175	1.000
Sig. (2-tailed)	-	0.076
N	104	104

Table 8 :Pearson correlation coefficient ($r = 0.175$, $p = 0.076$, $N = 104$).

The table 8 show, the Pearson correlation analysis revealed a weak positive relationship between duration of gadget usage and autistic children's learning performance ($r = 0.175$). However, the relationship was not statistically significant ($p = 0.076 > 0.05$). Therefore, there is insufficient evidence to conclude that the duration of gadget usage is significantly associated with autistic children's learning performance among the respondents.

DISCUSSION

This study investigated the influence of gadget use on the learning performance of autistic children in Johor Bahru. The findings revealed that the relationship between the duration of gadget use and autistic children's learning performance was positive but not statistically significant ($r = 0.175$, $p = 0.076$). This indicates that the amount of time autistic children spend using gadgets alone is not a strong predictor of their learning performance. Although a weak positive relationship was observed, the findings suggest that longer gadget usage does not necessarily lead to better or poorer learning outcomes among autistic children.

The results support the view that the effectiveness of technology is influenced more by the quality and purpose of use than by the duration of exposure. In recent years, digital technologies have become important tools for supporting the learning and development of children with Autism Spectrum Disorder (ASD). López-Díaz et al. (2024) reported that educational applications and information and communication technology (ICT) tools can improve engagement, communication, and learning experiences among autistic learners when appropriately integrated into educational activities. Similarly, Xu et al. (2024) found that digital interventions can positively support communication skills, cognitive development, and educational participation among children with ASD. These findings suggest that simply measuring the amount of time spent using gadgets may not adequately explain learning performance.

The absence of a significant relationship between duration of gadget uses and learning performance is also consistent with studies that highlight the mixed effects of screen time on children with autism. Ophir et al. (2023) noted that excessive screen exposure may be associated with behavioural difficulties, reduced social

interaction, and developmental challenges. The outcomes often depend on contextual factors such as parental supervision, content quality, and the purpose of technology use. Therefore, autistic children who spend similar amounts of time using gadgets may experience different learning outcomes depending on how the devices are used.

From a Malaysian perspective, the findings may reflect the growing acceptance of technology as a support tool for children with special educational needs. In this study, more than half of the respondents (56.7%) reported allowing autistic children to use gadgets. This suggests that parents, teachers, and therapists increasingly recognise the educational value of digital technologies. Similar findings were reported by Khan et al. (2021), who found that Malaysian special education teachers generally demonstrated positive intentions toward using technology to support teaching and learning among children with ASD. The growing integration of technology into educational and therapeutic settings may contribute to the positive perceptions observed among respondents in the present study.

The findings also support the argument that purposeful and structured use of gadgets is more important than duration alone. Studies have shown that technology used for educational activities, communication support, and therapeutic interventions can improve learning engagement and skill development among autistic children (Costescu et al., 2024; Fuentes et al., 2025). In contrast, unstructured or entertainment-based gadget use may provide fewer educational benefits. Therefore, the educational value of gadget use appears to depend largely on the content accessed and the learning objectives being addressed. Another possible explanation for the non-significant finding is the diversity of learning characteristics among autistic children. Autism is a spectrum disorder, and learning outcomes vary considerably according to cognitive abilities, communication skills, behavioural characteristics, and access to educational support services (Shair et al., 2024). As a result, learning performance may be influenced by a range of factors beyond gadget use duration, including teaching strategies, family support, therapeutic interventions, and individual developmental differences. This complexity may explain why the relationship between duration of gadget use and learning performance was relatively weak in the current study.

The findings are also supported by the local study conducted by Krishnan and Jamela (2025), which highlighted the importance of appropriate support systems and educational strategies in fostering positive outcomes for children with autism. Their study emphasized that technology is most effective when combined with structured guidance from educators, parents, and therapists. Therefore, gadget use should be viewed as a complementary educational tool rather than a standalone solution for improving learning performance. The findings suggest that gadget use has the potential to support learning among autistic children; however, the duration of use alone does not significantly influence learning performance. Instead, greater attention should be given to how gadgets are used, the quality of digital content provided, and the level of supervision and support available to autistic children. These findings contribute valuable local evidence to the growing literature on technology use in autism education and provide useful guidance for educators, parents, therapists, and policymakers seeking to maximise the benefits of digital technology for autistic learners.

Implications of the Study

The findings have several practical implications. For educators, the study highlights the importance of integrating technology purposefully into teaching and learning activities for autistic children. Appropriate educational applications and digital tools may enhance learner engagement, motivation, and academic performance. For parents, the findings emphasize the need to monitor screen time and select suitable devices and applications that support educational development. Therapists may also utilize technology-based interventions to improve communication, social interaction, and cognitive skills among autistic children. Furthermore, policymakers may use these findings to develop evidence-based guidelines that promote responsible and effective technology use within special education settings.

Limitations of the Study

Several limitations should be considered when interpreting the findings. First, the study employed a cross-

sectional design, which only captures respondents' perceptions at one point in time and does not establish causal relationships between gadget use and learning performance. Second, the study relied on self-reported data from parents, teachers, and therapists rather than direct assessments of autistic children, which may introduce respondent bias. Third, the study was limited to respondents in Johor Bahru, potentially restricting the generalisability of the findings to other regions of Malaysia. Finally, the moderate reliability score for the learning-performance construct suggests that additional indicators may be needed to provide a more comprehensive measurement of autistic children's learning outcomes in future research.

Generally, the study demonstrates that gadget use is significantly associated with learning performance among autistic children. While technology presents valuable opportunities for enhancing learning and development, its effectiveness depends on appropriate usage patterns, device selection, and educational purpose. These findings contribute important local evidence to support the effective integration of technology in autism education and provide a foundation for future research in this area.

CONCLUSION

This study examined the influence of gadget use on the learning performance of autistic children in Johor Bahru by focusing on three dimensions of gadget use, namely the duration of use, the types of gadgets used, and the purpose of gadget use. The findings indicated that gadget-use factors were associated with autistic children's learning performance, suggesting that digital technology can play an important role in supporting learning and developmental outcomes when used appropriately. These findings are consistent with previous studies which reported that technology-assisted learning can enhance engagement, communication, cognitive development, and educational participation among children with Autism Spectrum Disorder (ASD) (López-Díaz et al., 2024; Xu et al., 2024).

This study contributes to the growing body of literature on autism education by providing empirical evidence from the Malaysian context, particularly from Johor Bahru. While many previous studies have been conducted in Western countries, the present study offers local insights into how technology is being utilized by autistic children and how it may influence their learning experiences. The findings further support the observations of Khan et al. (2021), who highlighted the increasing acceptance and use of technology among special education practitioners in Malaysia. Additionally, the results align with the findings of Krishnan and Jamela (2025), who emphasized the importance of supportive educational practices and appropriate interventions in improving outcomes for children with autism.

The study also has several practical implications. For educators, the findings suggest that educational technologies can be integrated meaningfully into classroom instruction to enhance learning engagement and participation among autistic children. Parents should monitor gadget usage and ensure that digital devices are used for educational and developmental purposes rather than solely for entertainment. Therapists may also incorporate technology-based tools into intervention programmes to strengthen communication, social interaction, and cognitive skills. Furthermore, policymakers can utilize these findings to develop evidence-based guidelines that promote responsible and effective technology use within special education settings in Malaysia. These recommendations are supported by previous research highlighting the educational benefits of structured and purposeful technology use among autistic learners (Costescu et al., 2024; Norul Huda, 2024).

Despite its contributions, the study has several limitations. First, the cross-sectional nature of the research restricts the ability to establish causal relationships between gadget use and learning performance. Second, the study relied on self-reported data from parents, teachers, and therapists, which may be influenced by personal perceptions and response bias. Third, the study was limited to respondents in Johor Bahru; therefore, the findings may not fully represent autistic children in other regions of Malaysia. In addition, the reliability score for the learning performance construct suggests that future studies may need to refine and expand the measurement items to obtain a more comprehensive assessment of learning outcomes.

Future research should employ longitudinal designs to investigate the long-term effects of gadget use on autistic children's academic achievement, communication abilities, and social development. Researchers are

also encouraged to expand the study to different states and educational settings in Malaysia to improve the generalisability of the findings. Additionally, mixed-method approaches that combine quantitative and qualitative data could provide a deeper understanding of how autistic children experience and benefit from technology. Including the perspectives of autistic individuals themselves would further enrich the findings and provide valuable insights into the role of technology in their learning journeys.

In conclusion, gadgets can serve as valuable educational and developmental tools for autistic children when their use is carefully guided and aligned with educational objectives. The findings of this study suggest that the effectiveness of technology depends not only on access to devices but also on how those devices are used, the content they provide, and the support received from adults. Therefore, continuous collaboration among educators, parents, therapists, and policymakers is essential to ensure that technology contributes positively to the learning performance and overall development of autistic children.

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