



THE ROLE OF TECHNOLOGY USE IN SHAPING SOCIAL AND COGNITIVE DEVELOPMENT AMONG CHILDREN WITH AUTISM SPECTRUM DISORDER

Jennifer G. Sumagaysay¹, Letecia E. Eludo, PhD²

¹MAED SPED Student, University of Perpetual Help System DALTA - Las Piñas City

²Associate Professor, University of Perpetual Help System DALTA - Las Piñas City

ABSTRACT

The study seeks to assess the effect of technology use on the cognitive and social development of children with Autism Spectrum Disorder (ASD) in some public elementary schools in the Division of Rizal, School Year 2025-2026. It utilized a descriptive quantitative research design and a questionnaire formulated and validated by the researcher for 75 special education (SPED) teachers in some public elementary schools that provide facilities for children with Autism Spectrum Disorder (ASD). The influences of educational, therapeutic, and recreational types of technology content were explored on the cognitive development of ASD and communication, peer interaction, and emotional regulation of children with ASD for their social development. Results show that most of the learners' SDs were identified as male students aged between 8 and 10, who have level 1 autism disorder in terms of y, severity, have an attention span between 10 and 15 minutes and day, and spend 3 to 4 hours per day utilizing or making use of technologies. SPED teachers fully agree on the impact of using technology on the cognitive development of children with ASD, with recreational and therapeutic technology being highly rated compared to educational technology. Likewise, a high number of SPED teachers reported that technology significantly contributes to the social development of children with ASD through communication, Peer interaction, and emotional regulation. A statistically significant difference was found in perceptions of the impact of technology use on cognitive and social development when learners were categorized by age, sex, level of autism severity, attention span, and total screen time. No statistically significant relationship was identified between total screen time, the child's attention span, and autism severity and the total impact of technology use on both cognitive and social development. The results of the study recommend that proper use, screen control, appropriate content, and a therapeutic as well as an educational context should be maintained when allowing technology use as part of the inclusive special education setting and propose a Project TEACH (Total Enhanced Assistive Technology Communication and Happiness).

KEYWORDS: Autism Spectrum Disorder, technology use, cognitive development, social development, screen time, special education, assistive technology, educational technology, communication skills, emotional regulation.

I. INTRODUCTION

The rapid integration of technology in educational and therapeutic contexts has impact on the development of children with autism spectrum disorder (ASD). Technology-based goods are frequently used to aid children with ASD to enhance their communication, social skills, and cognitive skills. They vary from educational software to Augmentative Alternative Communication (AAC) devices to tablets and learning games. These aids if handled correctly can enable the students to become more attentive, concentrate better on their tasks and provide the students inclusive access. However worries do exist concerning the amount of screen time and impact on development.

"All children, including children with disabilities, have equal right to use technology and to education according to UN Convention on the Rights of the Child (UNCRC) and UN Convention on the Rights of Persons with Disabilities (UNCRPD). The children with disabilities have rights to go school and to use technology to receive education same as other children pursuant to Magna Carta for Persons with disabilities (Republic Act No. 7277) and Inclusive Education Act (Republic Act No. 11650). Although technology usage in special education is increasing, the effect of technology use on the social and cognitive development of children with ASD has

yet to be determined, especially in terms of the duration of time children spend in front of a screen and the types of digital content they are using.

Based on Vygotsky's Social Development Theory, this study explores SPED teachers' perceptions of how technology use impacts the social and cognitive development of children with ASD. The Institute has a particular interest in the impact of various types of screen exposure (educational, recreational and therapeutic) on the cognitive development of learners, their communication, peer interaction and emotional regulation. The results are intended to provide evidence based insights to educators, parents and policy makers for the creation of balanced and successful technology use policies that support holistic development of children with ASD.

1.1 Statement of the Problem

1. What is the demographic profile of learners with autism in terms of age, sex, severity of autism, attention span, and screen time per day?
2. What is the composite mean on the impact of technology use on the cognitive development of children with autism with respect to educational content, recreational content, and therapeutic content based on the observations of SPED teachers?



3. What is the composite mean on the utilization of technology in the social development of children with autism in terms of communication, peer interaction, and emotional regulation based on the observations of SPED teachers?
4. Is there a significant difference in the impact of technology use on cognitive development of children with autism with respect to type of screen exposure when grouped according to demographic background of the learner with autism handled by the SPED teacher?
5. Is there a significant difference in the impact of technology use on social development of children with autism when grouped according to demographic background of the learner with autism handled by the SPED teacher?
6. Is there a significant relationship between the screen time, attention span, and level of autism and impact of technology use on cognitive and social development of children with autism?
7. Based on the findings of the study what intervention program may be developed?

2. REVIEW OF RELATED LITERATURES AND STUDIES

Technology can occupy a massive amount of everyday life for most children, even children with Autism Spectrum Disorder (ASD). Studies have found that kids with ASD are more likely to spend significant amounts of time on screen compared to peers without ASD, and tech is therefore vital in aiding their education, communication and developmental needs (Stiller et al., 2022; Dong et al., 2021). While tech is capable of providing learning opportunities, assistive communication devices and interventions; there have been concerns over the potentially negative effects excessive screen use may have on social, cognitive and emotional development.

Studies demonstrate that technology's impact relies primarily on what kind of screen time, how much screen time, and the quality of screen time. It is well documented that well-chosen and supported curriculum could have beneficial results for attention, cognitive attention, language skills, and learning (Madigan et al., 2020, Panjeti-Madan and Ranganathan, 2023). In addition, therapeutic mobile applications, virtual reality based systems, and assistive devices resulted in benefits to speech, thinking skills and social life in ASD kids (Leung et al, 2021, Zhao et al., 2022). Some forms of assistive devices are documented to be useful to increase engagement during therapy and in educational activities as it may bring individualized attention with stimulating experiences (Purnama et al, 2021, Castro et al., 2024).

Even the purported benefits come at the cost of unregulated screen time having negative developmental consequences. Excessive use of screens has been found to affect the areas of language, executive skills, social engagement, emotional functioning, and interaction between a parent and their child (Muppalla et al., 2023; Dy et al., 2023) . One research article found children with ASD, who used screens extensively exhibited higher overall scores of symptoms of autism and worse child outcomes. (Dong et al., 2021) Another study found decreased use of screens with resulting

improvements in both core symptoms of ASD, and parental stress, was linked with reduction in overall screentime.

Technology also has an important part to play in improving social development. It has been evidenced that the use of technological-based interventions, such as: Virtual reality, Avatar-based teaching, multimedia programs, robotic technology and the use of communication platforms has significantly contributed to enhancement of communication skills, social skills in relation to interaction with peers, recognition of emotions, social engagement for children with ASD. Various advanced Augmentative and Alternative Communication (AAC) ,Picture Exchange Communication Systems (PECS)and social conversation skills on chatbot can offer effective practice to children with ASD in conducive surroundings (Samonte et al., 2020;Gagan et al., 2023).

Overall the data suggests that technology can make a big difference to the cognitive and social development of children with ASD, when used in the correct way and with the right supervision. However, too much screen time can be developmentally harmful, thus it is necessary to define a healthy pattern of technology usage, a healthy amount of screen time, and appropriate content exposure. These findings underscore the need for further research on the impact of using technologies for educational, recreational, and therapeutic purposes on the cognitive and social development of children with autism, especially in the context of special education settings.

II. RESEARCH METHODOLOGY

Research Design

The study utilized descriptive quantitative research approach to investigate the effect of technology use on children's cognitive and social development with Autism Spectrum Disorder (ASD). Quantitative data on teachers' observations of learners with ASD were collected using a survey questionnaire. The design was considered a good match for summarizing the existing conditions and discovering patterns among the variables in the study.

Population, Sampling, and Research Locale

The study was undertaken at some selected public elementary schools of the Division of Rizal, Philippines in School Year 2025-2026. The participating schools were the strata in a stratified random sampling method. Respondents were purposively chosen based on their experience in managing learners with ASD in the primary level.

Respondents of the Study

The respondents were composed of 75 Special Education (SPED) teachers from public elementary schools in the Division of Rizal who were directly addressing learners with ASD in the primary grades. The observations were the main source of data for the study.

Research Instrument

The data were collected through a researcher-made questionnaire consisting of three parts: (a) demographic profile of learners with ASD such as age, sex, severity of autism, attention span, and screen time; (b) impact of technology usage on cognitive development in terms of the educational,



recreational, and therapeutic contents; and (c) impact of technology usage on social development in terms of communication, peer interaction, and emotional regulation. The instrument was validated by experts and checked for reliability using Cronbach's alpha. Responses were measured on a 4-point Likert scale from 1 (Strongly Disagree) to 4 (Strongly Agree).

Data Gathering Procedure

Upon getting the consent from the concerned authorities, the Schools Division Office and participating school administrators were informed and given authorization to conduct the study. Consent was sought from respondents before data collection. Questionnaires were given out and collected throughout the period specified. The data were coded, tabulated

and analyzed using the Statistical Package for the Social Sciences (SPSS).

Statistical Treatment

The demographic profile of learners with ASD was outlined using frequency and percentage distributions. Perceived effect of technology use on cognitive and social development was determined using weighted mean. Chi-square tests were used to identify significant differences in the impact of technology use when respondents were categorized according to demographic variables. The Pearson's correlation coefficient (Pearson r) was used to assess the associations between screen time, attention span, severity of autism and the cognitive and social development indices.

III. RESULTS AND DISCUSSION

Demographic Background of the Learner with Autism Handled by the SPED Teacher in terms of Age, Sex, Severity of Autism, Attention Span, and Screen Time per Day

Table 1.1: Demographic Background of the Learner with Autism Handled by the SPED Teacher in terms of Age

Age	Frequency (f)	Percent
8-10	62	82.7
11-13	6	8.0
14 and above	7	9.3
Total	75	100.00

Table 1.1 shows the age distribution of learners with autism handled by SPED teachers. Results indicate that the majority of learners (82.7%, $n = 62$) were aged 8–10 years, while 9.3% ($n = 7$) were aged 5–7 years, and 8.0% ($n = 6$) were aged 11–13 years.

This shows that the majority of the learners with autism in the study were in the middle childhood stage, a developmental era of significant cognitive and social

development. The prevalence of learners between 8 and 10 years of age underscores the need for age appropriate educational interventions and technology based learning tools that help improve communication, social interaction and cognitive skills. These findings highlight the need for SPED programs and instructional technologies responsive to the developmental needs of learners with autism in this age group.

Table 1.2: Demographic Background of the Learner with Autism Handled by the SPED Teacher in terms of Sex

Age	Frequency (f)	Percent
Male	53	70.7
Female	22	29.3
Total	75	100.00

Table 1.2 presents the sex distribution of learners with autism handled by SPED teachers. The findings reveal that 70.7% ($n = 53$) of the learners were male, while 29.3% ($n = 22$) were female. This indicates that the majority of learners with autism included in the study were male.

This study supports the current evidence, demonstrating more males than females identified as learners with an ASD. Given the number of male learners in the sample,

the need for education interventions designed for learners on the autism spectrum must account for children of both sexes who display varied patterns of autism based on learning characteristics and the type of social interaction patterns each gender tends to exhibit. When working with learners with ASD, consideration to be given to the need for inclusive and interactive technology, along with responsive instructional approaches.

Table 1.3: Demographic Background of the Learner with Autism Handled by the SPED Teacher in terms of Severity of Autism

Severity of Autism	Frequency (f)	Percent
Level 1	48	64.0
Level 2	20	26.7
Level 3	7	9.3
Total	75	100.00

Table 1.3 presents the severity level of autism among learners handled by SPED teachers. The results show that the majority of learners were classified as Level 1 autism severity (64.0%, n

$= 48$), followed by Level 2 (26.7%, $n = 20$), while Level 3 accounted for the smallest proportion (9.3%, $n = 7$). These



findings indicate that most learners with autism in public elementary schools require relatively lower levels of support.

Since most participants had a diagnosis of Level 1 autism, most are able to tolerate an inclusive classroom with support, indicating how many children with autism can be successfully incorporated in school through communication supports, social interaction supports, and innovative

technology. School-based educational programs need to have services for children who need them: for instance, more specialized supports and individualized support for children that received a Level 2 or Level 3 diagnosis of autism . Educational Programs that Use Technology To Support Autism Severity Levels in the Inclusive Classroom.

Table 1.4: Demographic Background of the Learner with Autism Handled by the SPED Teacher in terms of Attention Span

Screen Time per day	Frequency (f)	Percent
10 minutes and below	25	33.3
11-15 minutes	30	40.0
16 minutes	14	18.7
21-25 minutes	6	8.0
Total	75	100.00

Table 1.4 presents the attention span of learners with autism as reported by SPED teachers. The findings show that the largest proportion of learners (40.0%, n = 30) had an attention span of 11–15 minutes, followed by 33.3% (n = 25) with 10 minutes or below. Meanwhile, 18.7% (n = 14) demonstrated an attention span of 16–20 minutes, and only 8.0% (n = 6) had an attention span of 21–25 minutes. These results indicate that most learners with autism have an attention span ranging from 10 to 15 minutes.

From these results, instruction for students with autism can be modified to account for reduced attention span. Learners can break down instructional content into smaller pieces and use attention-retaining tactics (e.g., visual or instructional materials, technology, or interaction), such as through play activities, to promote higher attention and participation in the classroom. In this way, educational instruction can become more suitable to learning styles and individual attention capabilities.

Table 1.5: Demographic Background of the Learner with Autism Handled by the SPED Teacher in terms of Screen Time per day

Screen Time per day	Frequency (f)	Percent
1-2 hours	18	24.0
3-4 hours	53	70.7
5-6 hours	4	5.3
Total	75	100.00

Table 1.5 presents the screen time per day of learners with autism as reported by SPED teachers. The results show that the majority of learners (70.7%, n = 53) had 3–4 hours of screen time per day, followed by 24.0% (n = 18) with 1–2 hours, while only 5.3% (n = 4) had 5–6 hours of daily screen time. These findings indicate that most learners with autism are exposed to screens for approximately 3–4 hours each day.

The study highlights technology as a familiar tool among students with autism and shows its impact on learning, social interaction, and skill development when used appropriately. Excessive use of screens also limits the chance for learners to socialize or even participate to non-screen activities. Hence SPED teachers and parents are advised to have partnership to practice appropriate usage or specific goal and/or training and balance among the two learning methods.

Composite Mean on the Role of Technology Use on Cognitive Development of Children with Autism with Respect to Type of Screen Exposure based on the SPED Teacher's Observation in terms of Educational Content, Recreational Content, and Therapeutic Content

Table 2: Composite Mean on the role of technology use on cognitive development of children with autism with respect to type of screen exposure based on the SPED teacher's observation in terms of educational content, recreational content, and therapeutic content

	Mean	Std. Deviation	Verbal Interpretation
Educational content	3.37	0.17	Agree
Recreational content	3.56	0.23	Strongly Agree
Therapeutic content	3.55	0.20	Strongly Agree
Impact of Technology Use on Cognitive Development of Children with Autism	3.50	0.13	Strongly Agree

Legend: 3.51 – 4.00 Strongly Agree; 2.51 – 3.50 Agree; 1.51 – 2.50 Disagree; 1.00 – 1.50 Strongly Disagree



Table 2 shows the overall composite of results in connection with using different types of content-educational, therapeutic, or recreational content-by children with autism in their cognitive development. For the three dimensions, recreational content obtained the highest mean score ($M=3.56$, $SD=.23$), followed by therapeutic content ($M=3.55$, $SD=.20$), with an interpretation as ‘Strongly Agree’. Lastly, educational content ($M=3.37$, $SD=.17$) was rated “Agree,” with an overall mean ($M=3.50$, $SD=.13$), implying strong agreement that using these screen activities may positively benefit their cognitive development.

The high evaluation of educational content shows that technology-based learning applications may help cognitive skills, including object identification, memory, and attention. This is congruent with the findings of Panjeti-Madan and Ranganathan (2023), who stated that educational applications improve learning abilities and cognitive development among youngsters by providing access to interesting and interactive learning experiences.

Composite Mean on the Impact of Technology Use on Social Development of Children with Autism Based on the SPED Teacher’s Observation in terms of Communication, Peer Interaction, and Emotional Regulation

Table 3: Composite mean on the impact of technology use on social development of children with autism based on the SPED teacher’s observation in terms of communication, peer interaction, and emotional regulation

	Mean	Std. Deviation	Verbal Interpretation
Communication	3.59	0.31	Strongly Agree
Peer interaction	3.59	0.23	Strongly Agree
Emotional regulation	3.65	0.25	Strongly Agree
Impact of Technology Use on Social Development of Children with Autism	3.61	0.19	Strongly Agree

Legend: 3.51 – 4.00 Strongly Agree; 2.51 – 3.50 Agree; 1.51 – 2.50 Disagree; 1.00 – 1.50 Strongly Disagree

Table 3 reflects the overall influence and impact on social behavior development of children with autism, as noted by SPED teachers’ observations regarding their usage of technology with an autistic child. Of the three aforementioned aspects discussed, emotional regulation has the highest mean ($M = 3.6$, $SD = 0.25$). Following emotional regulation is communication, with a mean ($M = 3.59$, $SD = 0.31$), and finally interaction with peers, with a mean of ($M = 3.59$, $SD = 0.23$). This indicates that SPED teachers are carefully attentive to and agree with these different facets discussed above. The composite mean is 3.61 ($SD = 0.19$), implying a high level of consensus among SPED teachers for implementing technology with children with autism.

The high score in the communication domain shows that technology-based tools support language development, social communication, and the use of communication skills in real-life circumstances. Our results are in line with those of Shater et al. (2023), who found significant gains in social communication and relationships in individuals with ASD who received technology-based therapies.

Like interaction, the high score of peer interaction shows that technology is a successful resource for facilitating interactions and collaborations among people with autism.

Research also identifies other beneficial effects of recreational content. Benefits include enhanced memory encoding, improved creativity, enhanced attention, and cognitive involvement. This corroborates Folta et al.’s (2022) research, which revealed that leisure and recreational activities were positively related to achievement, autonomy, and cognitive outcomes in children and adolescents with autism spectrum disorder. The study was perceived as useful for enhancing problem-solving ability, increasing social ability, improving attention, and improving cognitive performance. This indicates that technology-assisted therapeutic applications were adequate for enhancing the cognitive abilities of children with AS through well-designed,, structured,, and motivating activities (Purnama et al., 2021).

The findings imply that technology is a useful tool in supporting the cognitive development of children with autism, especially when recreational and therapeutic materials are correctly included in educational and intervention programs.

Similarly, Charlton et al. (2020) found that tech-guided social skills interventions helped develop conversation skills and social interactions with same-age peers.

Mean score for the topic of emotional regulation was high. This suggests that, with the assistance of technology-related tasks, they are able to distinguish and manage anger as well as express unpleasant feelings as they learn to regulate their behavior and emotions. Aligned with this finding, Samonte et al. (2024) explored the potential of assistive technology to identify and manage emotions and feelings during social engagement for people with autism.

Together, these results seem to indicate a positive impact of using technology on the social developmental outcomes of children with autism, as far as their communication, socialization, and mood regulation are concerned. These results are also consistent with those that use technology-assisted treatments and interventions to promote the social skills development of students with ASD. Finally, the results are consistent with those of Mostajo et al. (2023) on multimedia treatments that could positively influence learners with autism spectrum disorder in terms of adaptive behaviors, social functioning, and involvement.



Significant Difference in the Impact of Technology Use on Cognitive Development of Children with Autism with Respect to Type of Screen Exposure when Grouped According to Demographic Background of the Learner with Autism

Table 4: Test of significant differences in the role of technology use on cognitive development of children with autism with respect to type of screen exposure when grouped according to demographic background of the learner with autism

	t	df	Sig. (2-tailed)	Decision	Remarks
Age – Role of Technology Use on Cognitive Development of Children with Autism	-15.739	74	0.000	Reject	Significant
Sex – Role of Technology Use on Cognitive Development of Children with Autism	-40.548	74	0.000	Reject	Significant
Severity of Autism – Role of Technology Use on Cognitive Development of Children with Autism	-26.578	74	0.000	Reject	Significant
Attention Span – Role of Technology Use on Cognitive Development of Children with Autism	-13.628	74	0.000	Reject	Significant
Screen time per day – Impact of Technology Use on Cognitive Development of Children with Autism	-27.907	74	0.000	Reject	Significant

Table 4 Test of the significant difference of technology usage effect on the cognitive development of children with autism, with demographic variables. The findings indicated that all the demographics parameter the (age, sex, severity of autism, length of attention span, and daily screen time) found significant difference in term of perceive technology usage effect to the cognitive development of children with autism the results show that all the demographics features is the difference and sign (. $P = .000$, $p < .05$) on perceived technology usage effect on cognitive development of autistic children.

These findings suggest that personal attributes of students are critical determinants of effective technology-based applications. Age of the participants and the extent to which they responded to and profited from therapeutic, educational, and recreational technology, however, can be moderated by

attention, level of severity on the autism continuum, age, and level of existing on-screen media exposure. In summary, 21st-century, individualized, and appropriately age- and developmentally based technology programs for children with autism are required to address the range and diversity of cognition.

In line with Madigan et al. (2020), we also emphasize the importance of timing, context, and type of screen exposure in considering the impact on development. For example, their research highlighted the need to select the sort of digital content, regulate exposure time, and choose an adequate screen. It draws attention to the necessity of taking into account demographic variables in the design and delivery of technology-enhanced learning and intervention programming for young learners with autism.

Significant Difference in the Impact of Technology Use on Social Development of Children with Autism when Grouped According to Demographic Background of the Learner with Autism

Table 5: Test of significant difference in the impact of technology use on social development of children with autism when grouped according to demographic background of the learner with autism

	t	df	Sig. (2-tailed)	Decision	Remarks
Age – Impact of Technology Use on Social Development of Children with Autism	-16.531	74	0.000	Reject	Significant
Sex – Impact of Technology Use on Social Development of Children with Autism	-40.484	74	0.000	Reject	Significant
Severity of Autism – Impact of Technology Use on Social Development of Children with Autism	-27.179	74	0.000	Reject	Significant
Attention Span – Impact of Technology Use on Social Development of Children with Autism	-14.765	74	0.000	Reject	Significant
Screen time per day – Impact of Technology Use on Social Development of Children with Autism	-28.018	74	0.000	Reject	Significant



Table 5 demonstrates a comparison of significant differences in the impact of technology use on social development in autism across different groups by some demographic factors. The results indicated significant differences ($p < .05$) in some variables: age, sex of child, severity level of autism, and amount of screen time per day. Therefore, the null hypotheses were rejected, and we found a differing perception toward the impact of technology on social development depending on demographic differences

The results imply that the impact of technology on social development is contingent on individual learner characteristics. Age differences, autism severity, attention span, and screen time exposure may alter learners' communication skills, peer relationships, and emotional regulation outcomes. These findings highlight the importance of tailored and

developmentally appropriate technology-based interventions that are sensitive to the unique requirements and features of learners with autism. Technology may be more effective in supporting social development when it is adapted to learners' profiles.

These results corroborate those of Heffler et al. (2022), who found that exposure to screen media affected developmental outcomes among children with ASD and emphasized the benefits of organized therapies that control screen use and enhance social contact. The findings also indicate the need to consider demographic variables in the design and implementation of technology-based interventions for the social development of children with autism.

Significant Relationship Between the Screen Time, Attention Span, and Severity of Autism and the Impact of Technology Use on Cognitive and Social Development of Children with Autism

Table 6: Test of significant relationship between the screen time, attention span, and severity of autism and the impact of technology use on cognitive and social development of children with autism

		Cognitive Development	Social Development
Severity of Autism	Pearson Correlation	0.087	0.005
	Sig. (2-tailed)	0.458	0.965
	N	75	75
Attention Span	Pearson Correlation	-0.073	0.015
	Sig. (2-tailed)	0.533	0.900
	N	75	75
Screen time per day	Sig. (2-tailed)	0.053	-0.068
	N	0.653	0.561
	N	75	75
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 6 shows the results of testing the association between learners' screen time, attention span, severity of autism, and the impact of technology use on cognitive and social development. The results showed that all p-values were greater than 0.01. The perceived impact of technology use was not significantly related to severity of autism ($p = .458$, $r = .087$), attention span ($p = .533$, $r = -.073$), or screen time per day ($p = .653$, $r = .053$) for cognitive development. Similarly, no significant associations were found for severity of autism ($p = .965$, $r = .005$), attention span ($p = .900$, $r = .015$), or screen time per day ($p = .561$, $r = -.068$) for social development. Therefore, the null hypotheses were accepted.

The correlation coefficients were relatively poor, showing that screen time, attention span, and severity of autism were not significant predictors of the impact of technology use on either cognitive or social development in learners with autism. The results indicate that the success of technology may depend more on such aspects as the quality of digital material, instructional design, type of technological intervention, and context of technology use, rather than learner attributes alone. So the benefits of technology seem to generalize to learners irrespective of the amount of screen exposure, attention span, or level of autistic severity.

These results are in line with Dy et al. (2023), who highlighted that developmental outcomes are influenced not

only by the time of screen exposure but also by contextual factors such as parental participation, co-viewing, and the quality of screen-based activities. Findings from the present study indicate that to maximize the developmental benefits of technology for children with autism, more attention should be directed to intentional design and delivery of technology-based therapies rather than individual demographic features.

Action plan may be developed based on the findings of the study

Title of the Program: **Project TEACH (TEchnology Assistance for CHildren with Autism)**

Intervention Program on Role of Technology use for Learners with Autism Cognitive and Social Development SY 2027-2028

I. RATIONALE

The use of these applications led children with autism spectrum disorder (ASD) to overcome problems with communication and social interaction, in which some subjects had trouble focusing their attention, and their learning processes failed. As detected in the study, using technological tools had a positive impact on their cognitive development ($M=3.50$) and social development ($M=3.61$).

Given that, it has become clear that there is a need for a structured intervention system aimed at teaching and enabling



SPED teachers to guide parents and carers to utilize the computer in ways that promote effective and functional social and cognitive skills, without violating the principles of sound child development and allowing children to get the most out of technology use at home and at school. That's exactly why Project TEACH aims to empower both parents/carers and SPED teachers with the knowledge to support a child's social and cognitive development through technology.

II. OBJECTIVES

1. To provide teachers and parents with knowledge and skills on the appropriate use of technology to support children with Autism Spectrum Disorder.
2. To utilize educational applications, assistive technologies, and digital learning resources that promote

communication, social interaction, and cognitive development.

3. To improve children's participation and engagement in classroom and home-based learning activities through technology-assisted instruction.
4. To encourage balanced technology use by integrating digital learning with interactive, play-based, and face-to-face activities.
5. To strengthen collaboration among teachers, parents, therapists, and school administrators in monitoring and supporting children's technology use.
6. To evaluate the effectiveness of technology-assisted interventions in improving the social and cognitive development of children with Autism Spectrum Disorder.

Key Areas	Objectives	Intervention Activities	Sources of Funds	Timeline	Expected Outcomes
Pre-Implementation Period					
Preparation	Assess learners with autism	Learners with Autism Assessment	Faculty Funds (Php 3,000)	Apr–May 2027	All learners with autism assessed
	Procure assistive technology	Submission of project proposal and procurement	School Funds	Jul–Aug 2027	Materials and facilities procured
	Train SPED teachers	Technology-assisted instruction workshop	Program Funds	Jun–Jul 2027	Teachers trained in technology utilization
	Orient parents	Parents orientation on intervention program	Forum/Resource Persons	Jul–Sep 2027	Parents informed and consent obtained
Implementation Period					
Cognitive Development	Improve cognitive skills	Educational apps, phonics, puzzles, logic games, gamified learning	Canteen Funds (Php 3,000)	Jun 2027–Apr 2028	Improved memory, attention, and problem-solving
Social Development	Enhance communication and peer interaction	Storytelling games, role play, speech apps, collaborative tools	Canteen Funds (Php 1,500)	Jul 2027–Apr 2028	Improved communication and social interaction
Independent Learning & Emotional Regulation	Promote independence and emotional regulation	Gamified platforms, emotion-recognition and mindfulness apps	Stakeholder Funds (Php 1,500)	Jun 2027–Apr 2028	Greater independence and emotional management
Post-Implementation Period					
Monitoring and Evaluation	Assess program effectiveness	Regular monitoring and evaluation	School Funds (Php 2,000)	Jan–Apr 2028	Program effectiveness evaluated



IV. SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

SUMMARY OF FINDINGS

This study examined the influence of technology use on the cognitive and social development of learners with ASD, as perceived by SPED teachers in public elementary schools. Most learners with autism have had mostly Male (92%), (8-10 years) in terms of age, (Level 1) as classification and level of severity, (10-15) minutes in terms of attention and (3-4) hours of exposure in the use of technology. Generally, the use of technology was perceived to have favorable effects on cognitive development in terms of playing materials (3.56), special learning materials (3.55), and even educational learning materials (3.37) for an overall mean of 3.50. Generally, the use of technology was found to be favorable to social development in terms of communication, interaction with peers (3.59 each), and control over emotional response (3.65), for an overall mean of 3.61. There were significant differences in the effects of technology use on both cognitive and social development among respondents across the different profile variables. Meanwhile, the variables of time spent on screen (1.535), attention span (1.972), and level of severity (1.849) showed no significant association with perceived effectiveness on both cognitive and social development among learners with Autism Spectrum Disorder (ASD) of SPED teachers in public elementary schools.

CONCLUSIONS

Technology proves to be an effective tool in facilitating cognitive and social development of children with autism spectrum disorder. Recreational and therapeutic digital media were more likely to promote attentiveness, memory, communication, peer relationships, and emotional regulation skills. Screen time, children's attention abilities, and severity of their condition had no effect or were weakly correlated with the outcome variable, regardless of participant demographic features or how they perceived the effective use of such technologies for learning. Technology should be viewed as an important educational and social developmental resource for learners with autism when used and matched appropriately to their individual needs.

RECOMMENDATIONS

The following research, implementation recommendations, and implications for SPED educators are proposed. Schools and SPED teachers should further embed technology-based interventions by using suitable educational, recreation, and therapeutic programs that are relevant to learners with ASD in developing their cognitive and social learning. Educational technology must be adapted and personalized to learners' developmental and demographic characteristics to balance virtual and real-world learning environments. There are available training or learning opportunities to develop their competence in technology integration in Special Education classrooms, and parents need to participate in home education by monitoring their children. Moreover, the study could be expanded to include another possible variable with larger samples in further investigation.

REFERENCES

1. Cardy, R. E., Dupuis, A., Anagnostou, E., Ziolkowski, J., Biddiss, E. A., Monga, S., Brian, J., Penner, M., & Kushki, A. (2021). Characterizing changes in screen time during the COVID-19 pandemic school closures in Canada and its perceived impact on children with autism spectrum disorder. *Frontiers in Psychiatry*, 12, Article 702774. <https://doi.org/10.3389/fpsy.2021.702774>
2. Castro, B. N., Daquipil, G. L., Macainag, R. A., Tan, M. A., & Bongo, M. (2024). Prioritizing educational technologies for children with intellectual disabilities under fuzzy MCDM perspective. *Disability and Rehabilitation: Assistive Technology*, 1-12. <https://doi.org/10.1080/17483107.2024.2424880>
3. Charlton, C. T., Kellem, R. O., Black, B., Bussey, H. C., Ferguson, R., Goncalves, B., Vallejo, S., & others. (2020). Effectiveness of avatar-delivered instruction on social initiations by children with autism spectrum disorder. *Research in Autism Spectrum Disorders*, 71, 101494. <https://doi.org/10.1016/j.rasd.2019.101494>
4. Dong, H., Wang, B., Li, H., Yue, X., & Jia, F. (2021). Correlation between screen time and autistic symptoms as well as development quotients in children with autism spectrum disorder. *Frontiers in Psychiatry*, 12, Article 619994. <https://doi.org/10.3389/fpsy.2021.619994>
5. Dy, A. B. C., & Santos, S. K. (2023). Measuring effects of screen time on the development of children in the Philippines: A cross-sectional study. *BMC Public Health*, 23(1). <https://doi.org/10.1186/s12889-023-16188-4>
6. Folta, S. C., Bandini, L. G., Must, A., Pelletier, J., Ryan, K., & Curtin, C. (2022). Exploring leisure time use and impact on well-being among transition-age autistic youth. *Research in Autism Spectrum Disorders*, 96, 101996. <https://doi.org/10.1016/j.rasd.2022.101996>
7. Gagan, I. T., Matias, M. A. M., Tan, I., Vinco, C. M., & Ong, E. (2023). Preparing children with Level 1 ASD for social interactions through storytelling with Amy: An exploratory study. In *Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems* (pp. 1-7).
8. Heffler, K. F., Frome, L. R., Garvin, B., Bungert, L. M., & Bennett, D. S. (2022). Screen time reduction and focus on social engagement in autism spectrum disorder: A pilot study. *Pediatrics International*, 64(1). <https://doi.org/10.1111/ped.15343>
9. Leung, P. W. S., Li, S. X., Tsang, C. S. O., Chow, B. L. C., & Wong, W. C. W. (2021). Effectiveness of using mobile technology to improve cognitive and social skills among individuals with autism spectrum disorder: Systematic literature review. *JMIR Mental Health*, 8(9), e20892. <https://doi.org/10.2196/20892>
10. Madigan, S., McArthur, B. A., Anhorn, C., Eirich, R., & Christakis, D. A. (2020). Associations between screen use and child language skills: A systematic review and meta-analysis. *JAMA Pediatrics*, 174(7), 665-675. <https://doi.org/10.1001/jamapediatrics.2020.0327>
11. Mostajo, S., Salva, R., Legaspi, O., Dominguez, J., & Garcia, A. (2023). Evaluation of multimedia-based intervention for students with autism spectrum disorder: A pilot study. *Exceptionality Education International*, 33(1).
12. Muppalla, S. K., Vuppapapati, S., Pulliahgaru, A. R., & Sreenivasulu, H. (2023). Effects of excessive screen time on child development: An updated review and strategies for management. *Cureus*, 15(6).



- <https://doi.org/10.7759/cureus.40608>
13. Panjeti-Madan, V. N., & Ranganathan, P. (2023). Impact of screen time on children's development: Cognitive, language, physical, and social and emotional domains. *Multimodal Technologies and Interaction*, 7(5), 52. <https://doi.org/10.3390/mti7050052>
 14. Purnama, Y., Herman, F. A., Hartono, J., Neilsen, N., Suryani, D., & Sanjaya, G. (2021). Educational software as assistive technologies for children with autism spectrum disorder. *Procedia Computer Science*, 179, 6–16. <https://doi.org/10.1016/j.procs.2020.12.002>
 15. Samonte, M. J. C., Guelos, C. M. C., Madarang, D. K. L., & Mercado, M. A. P. (2020). Tap-to-talk: Filipino mobile-based learning augmentative and alternative communication intervention for children with autism. In *Proceedings of the 6th International Conference on Frontiers of Educational Technologies* (pp. 25–29). <https://doi.org/10.1145/3404709.3404747>
 16. Samonte, M. J., Nitta, K., Datu, C., & Erpelo, R. (2024). Critical analysis on the design and development of an e-learning system for autism spectrum disorder intervention through gamified augmented reality and emotion recognition. In *Proceedings of the International Conference on Interactive Media, Smart Systems and Emerging Technologies* (pp. 400–409). <https://doi.org/10.1145/3695652.3695658>
 17. Shater, A., Bani-Rshaid, A. M., Al-Fayoumi, M. M. I., Al-Shaar, A. S., Bukhamseen, A. M., & Khasawneh, M. A. S. (2023). Peer-mediated intervention through Snapchat: Enhancing social interactions among students with autism. *International Journal of Data and Network Science*, 7(4), 2083–2088. <https://doi.org/10.5267/j.ijdns.2023.10.101>
 18. Stiller, A., Weber, J., Strube, F., & Mößle, T. (2019). Caregiver reports of screen time use of children with autism spectrum disorder: A qualitative study. *Behavioral Sciences*, 9(5), 56. <https://doi.org/10.3390/bs9050056>
 19. Westby, C. (2020). Screen time and children with autism spectrum disorder. *Folia Phoniatrica et Logopaedica*, 73(3), 233–240. <https://doi.org/10.1159/000506682>
 20. Zhao, J., Zhang, X., Lu, Y., Wu, X., Zhou, F., Yang, S., Wang, L., Wu, X., & Fei, F. (2022). Virtual reality technology enhances the cognitive and social communication of children with autism spectrum disorder. *Frontiers in Public Health*, 10, Article 1029392. <https://doi.org/10.3389/fpubh.2022.1029392>