

Parents using Assistive Technological Devices to Intervene Communication Language of Children with Autism Spectrum Disorder

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Abstract

Background: Children with Autism Spectrum Disorder (ASD) often face significant communication and language challenges, making home-based interventions crucial to their development. Assistive technological devices, both high-tech and low-tech, serve as pivotal tools for parents serving as communication interventionists.

Objective(s): This study aimed to examine how parents use assistive technological devices to intervene in the communication language deficits of children with ASD, determine their perceived usefulness, explore parents' lived experiences, and propose a structured communication language intervention program.

Methods: A convergent parallel mixed-methods design was employed involving 30 purposively selected parents of children with ASD enrolled in public elementary schools in the Division of Northern Samar. Quantitative data were collected using a researcher-modified, validated Likert-scale questionnaire and analyzed using frequency, percentage, mean, and overall mean. Qualitative data were gathered through open-ended questions and analyzed using Braun & Clarke's six-step thematic analysis.

Results: The majority of parents were 30–39 years old (47%), female (87%), and high school graduates (57%). The overall utilization of assistive devices was limited for both high-tech (Overall Mean=1.83\text{Overall Mean} = 1.83Overall Mean=1.83, Rarely Used) and low-tech tools (Overall Mean=2.37\text{Overall Mean} = 2.37Overall Mean=2.37, Rarely Used). Television was the most accessed high-tech device (Mean=3.57\text{Mean} = 3.57Mean=3.57, Often Used), while the Picture Exchange Communication System (PECS) was the most utilized low-tech tool (Mean=3.20\text{Mean} = 3.20Mean=3.20, Sometimes Used). Parents perceived high-tech devices (Overall Mean=3.51\text{Overall Mean} = 3.51Overall Mean=3.51, Agree) and low-tech devices (Overall Mean=3.64\text{Overall Mean} = 3.64Overall Mean=3.64, Agree) as beneficial in supporting vocabulary, expression of needs, and learning motivation. Qualitative findings yielded 13 main themes highlighting parental strategies (repetition, play, visual aids), observed progress (increased vocabulary, reduced tantrums), emotional milestones, and structural challenges (need for patience, training, and consistency).



Conclusion: Assistive technological devices facilitate effective communication language intervention when applied consistently with adult guidance. A structured, parent-guided intervention program combining low-cost visual tools, guided technology, and progress monitoring is recommended to empower home-based intervention.

Keywords: *Assistive Technological Devices, Autism Spectrum Disorder, Communication Language Deficits, Parents, Intervention Program*

1. Introduction

Communication serves as a fundamental bridge between a child and the world; however, children with Autism Spectrum Disorder (ASD) frequently encounter persistent difficulties in expressing needs, responding to social cues, and utilizing functional speech. Globally, the prevalence of ASD emphasizes the urgent requirement for accessible, family-centered interventions. The World Health Organization and UNICEF highlight the pivotal role of assistive technology—ranging from low-cost visual supports to interactive digital software—in mitigating developmental communication delays.

In the Philippines, families of children with ASD often face barriers related to the affordability of specialized therapeutic services and assistive devices. In rural or public school settings such as the Division of Northern Samar, parents frequently step into the primary role of communication language interventionists outside the formal classroom. While existing literature heavily focuses on clinical interventions and technology design, limited empirical focus has been directed toward the real-world practices and lived experiences of parents applying these technologies within daily home routines.

Research Objectives & Questions

This study evaluated the application of assistive technological devices by parents intervening in the communication language deficits of children with ASD. Specifically, it addressed the following:

What is the demographic profile of the parent-respondents in terms of age, sex, and educational attainment?

What types of assistive technological devices (high-tech vs. low-tech) are utilized by parents?

What is the frequency of utilization of low-tech tools (e.g., PECS, visual schedules) and high-tech tools (e.g., tablets, mobile apps, television)?

How do parents perceive the helpfulness of assistive technology in facilitating communication and language development?

What are the lived experiences, systemic barriers, and structural challenges encountered by parents during home implementation?

What Parent-Guided Assistive Technology Communication Language Intervention Program can be developed based on the integrated findings?

2. Materials and Methods

Research Design

The study utilized a **convergent parallel mixed-methods design**. Quantitative and qualitative data were collected concurrently during the same research phase, analyzed independently, and integrated to provide a comprehensive understanding of quantitative utilization trends alongside qualitative personal experiences.

Participants

A total of thirty (30) parents of children diagnosed with ASD enrolled in selected public elementary schools in the Division of Northern Samar were selected using **purposive sampling**. Criteria for inclusion required that participants were parents or legal guardians of an enrolled child with ASD and possessed experience using low-tech or high-tech devices for communication support.

Instruments

A **researcher-modified survey questionnaire** served as the primary instrument, structured into four sections:

Part I: Demographic Profile (Age, Sex, Educational Attainment).

Part II: Frequency of Use of High-Tech (17 items) and Low-Tech (6 items) Assistive Devices, measured on a 5-point Likert scale (1=Not Used at All1 = \text{Not Used at All}1=Not Used at All to 5=Always Used5 = \text{Always Used}5=Always Used).

Part III: Perceived Helpfulness and Language Impact of Devices, measured on a 5-point Likert scale (1=Strongly Disagree1 = \text{Strongly Disagree}1=Strongly Disagree to 5=Strongly Agree5 = \text{Strongly Agree}5=Strongly Agree).

Part IV: Qualitative Component containing dichotomous and open-ended questions designed to examine personal experiences, challenges, and strategies.

Procedure

Content validity was established through evaluation by three expert validators in Special Education (SPED). Internal consistency was confirmed via Cronbach's Alpha reliability testing. Institutional approvals were secured from the Schools Division Superintendent and school heads. Informed consent was obtained from all participants prior to data collection, ensuring strict confidentiality, anonymity, and data privacy compliance. Administration was executed via digital platforms (Google Forms) and physical distributions over a two-week period.

Data Analysis

Quantitative Data: Descriptive statistics, including frequency distributions, percentages, itemized weighted means, and overall means, were computed using SPSS software.

Qualitative Data: Transcriptions of open-ended narrative responses were analyzed following Braun & Clarke's (2006) Six-Step Thematic Analysis framework (Familiarization, Initial Coding, Searching for Themes, Reviewing Themes, Defining Themes, and Producing the Report).

3. Results

Demographic Profile of Respondents

The demographic distribution revealed that most parents were aged 30–39 years (47%47\%47%) and female (87%87\%87%), with 57%57\%57% having completed high school as their highest educational level.

Profile Category	Sub-category	Frequency (f)	Percentage (%)
Age	20–29 years old	4	13%13\%13%
	30–39 years old	14	47%47\%47%
	40–49 years old	10	33%33\%33%
	50 years old and above	2	7%7\%7%
Sex	Female	26	87%87\%87%
	Male	4	13%13\%13%
Educational Attainment	High School Graduate	17	57%57\%57%
	College Graduate	13	43%43\%43%

Utilization of Assistive Technological Devices

The frequency of utilization for high-tech devices (Overall Mean=1.83\text{Overall Mean} = 1.83Overall Mean=1.83, Rarely Used) and low-tech devices (Overall Mean=2.37\text{Overall Mean} = 2.37Overall Mean=2.37, Rarely Used) indicated limited overall technology adoption at home.

High-Tech Devices Utilization (Selected Summary)

Device	Mean	Descriptive Interpretation
Television	3.57	Often Used
Personal Computer (PC)	2.90	Sometimes Used
Smart Phone	2.63	Sometimes Used
Laptop	2.13	Rarely Used
iPad / Tablet	1.50–1.60	Not Used at All
Specialized AAC Devices / Apps	1.53–1.67	Not Used at All
Overall High-Tech Mean	1.83	Rarely Used

Low-Tech Devices Utilization

Device	Mean	Descriptive Interpretation
Picture Exchange Communication System (PECS)	3.20	Sometimes Used
Sensory / Stress Balls	3.10	Sometimes Used
Short Social Stories	3.07	Sometimes Used
Bottles	2.20	Rarely Used
Board Makers / Shoe Boxes	1.20–1.47	Not Used at All
Overall Low-Tech Mean	2.37	Rarely Used

Parents' Perceptions on Technology Helpfulness

Independent Interface Usability: Parents agreed that assistive devices aid communication and social skills (Mean=4.10\text{Mean} = 4.10Mean=4.10), yielding a neutral overall perception (Overall Mean=3.32\text{Overall Mean} = 3.32Overall Mean=3.32, Neither Agree nor Disagree) due to concerns regarding implementation effort and time constraints.

High-Tech Device Language Impact: Parents agreed that high-tech devices were convenient and frequently integrated into weekly routines (Overall Mean=3.51\text{Overall Mean} = 3.51Overall Mean=3.51, Agree).

Low-Tech Device Usability: Low-cost materials, picture cards, and manipulators received positive approval (Overall Mean=3.64\text{Overall Mean} = 3.64Overall Mean=3.64, Agree).

Perceived App Benefits: Mobile learning applications were recognized for entertaining children (Mean=3.80\text{Mean} = 3.80Mean=3.80), containing fun characters (Mean=3.90\text{Mean} = 3.90Mean=3.90), and capturing attention (Mean=3.47\text{Mean} = 3.47Mean=3.47), though adult supervision was deemed essential (Overall Mean=3.55\text{Overall Mean} = 3.55Overall Mean=3.55, Agree).

Qualitative Qualitative Findings: Lived Experiences

The thematic analysis generated 13 distinct themes:

Communication Profile: Children exhibited diverse profiles (verbal, non-verbal, and limited verbal).

Communication Practices: Parents utilized daily conversations, play-based activities, and storytelling.

Low-Tech Tool Usage: Picture exchange, visual schedules, and simple gestures reduced frustration.

High-Tech Tool Usage: Smartphones and educational applications provided engagement and visual stimulation.

Expression of Needs: Children communicated via pointing, leading adults to objects, and single-word requests.

Therapy Participation: Variable access to weekly or monthly professional speech therapy.

Therapy Focus: Interventions targeted object labeling, imitation, and functional requesting.

Home Follow-up: Reinforcement varied based on parental available time and consistency.

Verbal Learning Strategies: Use of praise, vocal repetition, storytelling, and music.

Emotional Journeys: Expressions of joy, hope, pride, and occasional fatigue.

Observed Progress: Expanded vocabulary, clearer requests, and reduced behavioral meltdowns.

Implementation Challenges: High demand for patience, slow developmental progress, and lack of technical training.

Meaningful Parent Experiences: Deepening parent-child bonding through sustained, purposive communication.

4. Discussion

The findings illustrate that while parents harbor positive perceptions regarding the value of assistive devices, actual device utilization at home remains low. High-tech adoption is restricted by financial constraints and access limitations, leaving accessible appliances like televisions and standard smartphones as primary digital resources. Low-tech visual strategies (e.g., PECS, social stories) are preferred due to their affordability, direct application, and effectiveness in mitigating communication frustration.

The integration of quantitative and qualitative data emphasizes that technology alone cannot replace structured interaction. Guided parental modeling, vocal repetition, and structured daily routines are vital to translating device interaction into functional communication. The observed reliance on mothers and parents with basic secondary education highlights a critical need for accessible, practical, and non-technical training frameworks supported by local school systems.

5. Conclusion and Recommendations

Conclusion

Caregiver Demographics: Mothers represent the primary home-based communication interventionists, requiring accessible and user-friendly intervention guides suited to diverse educational backgrounds.

Device Adoption Gaps: High-tech specialized AAC infrastructure is minimally accessed due to resource limitations, whereas accessible low-tech tools (PECS) and everyday devices (smartphones, televisions) form the core of current home support.

Perceived Value vs. Execution: Parents recognize the clear developmental benefits of assistive tools but encounter implementation barriers including time constraints, lack of formal training, and consistency challenges.

Role of Structured Home Interventions: Sustainable communication progress in children with ASD relies on the synergy between assistive tools, consistent parental guidance, and routine-based practice.

Recommendations & Proposed Intervention Program

To bridge the gap between technology potential and home practice, a **Parent-Guided Assistive Technology Communication Language Intervention Program** is established:

Program Structure: A 2-week starter cycle structured across 7 key components: Parent Orientation, Device Identification, Low-Tech Training, High-Tech Guided Practice, Home Routine Integration, Feedback Sessions, and Individualized Support Planning.

Routine Integration: Embedding low-tech picture exchanges and guided app interactions into daily mealtimes, play, study, and bedtime routines.

Institutional Support for Stakeholders:

School Administrators & DepEd: Allocate resources for low-cost SPED visual material banks and institutionalize parent training workshops.

Teachers & SPED Coordinators: Conduct routine coaching sessions and provide simplified progress-monitoring checklists for parents.

Parents: Maintain continuous, praise-reinforced practice using available low-cost materials and guided device screen time.

Future Researchers: Expand sample sizes across diverse regional divisions and conduct longitudinal outcome evaluations comparing specific low-tech versus high-tech intervention cohorts.

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