



Enhancing Retention Skills of Students with Autism Spectrum Disorder (ASD) Through the Shoebox Technique

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Abstract

Learners with autism spectrum disorder (ASD) commonly experience challenges recognizing, retaining, and applying information. This study examined changes in retention skills following the Shoebox Technique among 25 learners with ASD at the Special Education Center of Marigondon Elementary School, Lapu-Lapu City, during School Year 2026–2027. A one-group pretest–posttest design was employed, with participants selected through purposive sampling. An adapted assessment instrument, reviewed by three experts, measured recognition and identification, short-term recall, and application and association before and after two weeks of learning sessions. Data were analyzed using weighted means, standard deviations, and paired-samples t-tests at the 0.05 significance level. The summary table reported pre-intervention means of 2.20, 2.06, and 2.20 across the three dimensions, respectively, increasing to 3.73, 3.83, and 3.68 after intervention. The overall mean increased from 2.15, described as rarely observed, to 3.75, described as often observed. Reported paired comparisons were statistically significant across all dimensions and overall ($p < .001$). Short-term recall showed the largest reported mean increase. The findings supported the development of an Improved Shoebox Technique Intervention Program featuring structured visual learning kits, repeated practice, and progressive recognition, recall, and association activities. The study recommends classroom and home use alongside continued evaluation across broader populations and longer periods.

Keywords: *Autism Spectrum Disorder, Marigondon Elementary School, retention skills, inclusive education, quasi-experimental design, Shoebox Technique*

Introduction

Children with Autism Spectrum Disorder (ASD) commonly face challenges retaining learned skills across different activities and settings, even after repeated instruction. Skill retention the ability to maintain and apply knowledge, behaviors, and competencies over time is foundational to meaningful participation in inclusive classrooms and daily life. Without consistent retention, cumulative learning falters, independence remains limited, and inclusive access cannot translate into lasting progress. While inclusive education policies mandate access to the least restrictive environment, many recommended strategies are complex, costly, or require specialized training that public school SPED teachers often lack. This study centers on enhancing retention skills of students with autism spectrum disorder (ASD) through the Shoebox Technique, a practical, low-cost, structured approach designed to fit seamlessly into regular classroom routines.

A systematic review and meta-analysis estimate the global prevalence of ASD among children at 0.77%, with a higher rate of 1.14% among boys, underscoring the widespread need for effective, accessible interventions (Issac et al., 2025). UNESCO (2025) emphasizes that supporting autistic learners requires moving beyond diagnosis to prioritize lived experience and inclusive practice, while UNESCO (2026) notes that gaps in tracking retention and learning outcomes keep many learners overlooked despite global commitments. UNESCO MGIEP (2025) adds that inclusive education must serve all learners' diverse needs, rather than relying on separate or resource-heavy solutions. However, Locke et



al. (2022) found that although evidence-based practices exist, most educators struggle to apply them consistently due to limited training and resources. In this context, the Shoebox Technique, rooted in the TEACCH structured-teaching framework, stands out as a proven tool: visually clear, requiring minimal verbal direction, and designed to build independence and skill maintenance without expensive materials or elaborate preparation (Centering on Children Inc., n.d.).

Philippine laws affirm the right of autistic learners to quality inclusive education, yet local realities include limited specialist support, uneven teacher training, and constrained school budgets. Most existing research and interventions are based on Western populations, with few studies addressing Filipino children's unique needs and contexts. Fernandez et al. (2024) note that even common challenges such as feeding difficulties linked to attention and learning are often under-addressed, and the impact of pandemic-related disruptions on skill retention remains largely unexplored. There is a clear need for strategies that are culturally appropriate, affordable, and easy to implement in typical public-school settings.

At Marigondon Elementary School, SPED teachers observe that many learners with ASD struggle to hold onto skills previously taught, even with repeated practice. Retention is a critical concern for these learners because without it, every lesson must essentially be taught anew; skills never accumulate into lasting competence, and learners cannot function independently across classroom, home, and community settings. The Shoebox Technique should improve retention because it organizes tasks into predictable, visually consistent routines that reduce cognitive overload and reinforce memory consolidation through daily, stable practice the most reliable way to strengthen long-term recall. It is particularly appropriate for learners with ASD because it relies on visual cues rather than spoken instructions, provides clear structure and boundaries that reduce anxiety, and builds independence step-by-step, closely matching the learning preferences and needs common among autistic learners. While educators are committed to inclusive practice, they face practical constraints: large classes, competing responsibilities, limited funding, and few opportunities for specialized training in retention-focused methods. Teachers find that many recommended approaches are too costly, time-consuming, or complicated to integrate into daily lessons. Consequently, the SPED team seeks effective, simple, low-cost strategies that can be used daily without extra burden criteria closely matched by the Shoebox Technique, which aligns with the visual, structured learning preferences common among autistic learners.

Despite extensive literature on ASD prevalence, inclusive policies, and evidence-based practices, no local study has specifically examined enhancing retention skills of students with autism spectrum disorder (ASD) through the Shoebox Technique in public elementary schools. Most intervention models are designed for well-resourced settings and do not account for the practical, financial, and cultural realities of schools like Marigondon Elementary School. This study addresses that gap by investigating how this accessible, low-cost method can be used to improve skill retention and support meaningful, lasting learning outcomes for autistic learners in inclusive classrooms.

Statement of the Problem

This study determined the effectiveness of the Shoebox Technique in enhancing the retention skills of learners with autism spectrum disorder (ASD) at Marigondon Elementary School during the School Year 2026–2027.

The study examined retention skills before and after intervention in recognition and identification, short-term recall, and application and association; tested the difference between pre-intervention and post-intervention levels; and used the findings to design an improved Shoebox Technique intervention program.

Specifically, it sought to answer the following questions:

What is the level of retention skills of the learners before the intervention in terms of:

1.1 Recognition and Identification;

1.2 Short-Term Recall; and

1.3 Application and Association?

What is the level of retention skills of the learners after the intervention in terms of:

2.1 Recognition and Identification;

2.2 Short-Term Recall; and



2.3 Application and Association?

Is there a significant difference between the level of retention skills of the learners before and after the intervention of shoebox technique?

Based on the findings, what improved Shoebox Technique intervention program can be designed for the learners?

Null Hypothesis

There is no significant difference between the level of retention skills of the learners before and after the intervention of shoebox technique.

Literature Review

Theoretical Framework

This study assumes that assessing the effectiveness of the Shoebox Technique can improve the retention skills of learners with Autism Spectrum Disorder (ASD). The study is primarily anchored on the TEACCH Structured Teaching Approach developed by Eric Schopler and the TEACCH team (1972). Furthermore, the study is supported by Social Learning Theory by Albert Bandura (1977), Operant Conditioning Theory by B.F. Skinner (1954), and Information Processing Theory by Richard Atkinson and Richard Shiffrin (1968), later expanded by Alan Baddeley (1986).

TEACCH Structured Teaching Approach

The primary theory that anchors the study is the TEACCH (Schopler and the TEACCH Team, 1972) framework, grounded in the unique learning profile of individuals with ASD specifically their strengths in visual processing and challenges with organization, attention, and understanding unstructured environments. It uses four core components: physical structure, visual schedules, clear work systems, and organized task presentation to make activities predictable, meaningful, and accessible. By capitalizing on visual strengths and reducing ambiguity, it supports learners in focusing, following instructions, and working independently.

This theory directly supports the Shoebox Technique, which represents an individualized, task-structured adaptation derived directly from TEACCH principles. The technique organizes learning materials into distinct, visual compartments that clearly signal what to do, the sequence of steps, and when a task is finished embodying TEACCH's emphasis on structured presentation and visual clarity. It aligns with the study's variables recognition/identification, short-term recall, and application/association by structuring content to highlight visual cues, separate information into manageable units, and reinforce connections between items. The approach justifies how structured, visual organization reduces cognitive load and anxiety, helping learners attend better and retain information more effectively before and after intervention.

Social Learning Theory

One of the supporting theories of the study is Social Learning Theory (Bandura, 1977). Social Learning Theory posits that learning occurs through observation, imitation, and modelling, involving four interrelated processes: attention (noticing the model), retention (storing observed information symbolically), reproduction (acting on what was observed), and motivation (being reinforced to perform the behaviour). Unlike earlier behavioural views, it acknowledges cognitive mediation learners actively process and retain modelled actions and information based on meaning and perceived value.

The Shoebox Technique is designed to incorporate these principles: it provides a clear, consistent visual structure where learners observe how items are matched, sorted, or retrieved from compartments during teacher demonstration and guided practice directly engaging the attention and retention processes central to Bandura's framework. The technique's predictable, repeated task formats create ideal conditions for observational learning, while its visual cues help learners mentally rehearse and retain what they observe. It supports the study's variables by offering repeated opportunities to observe, mentally rehearse, and practice recognition, recall, and association tasks. The theory also explains how positive feedback and successful completion built into the Shoebox design motivate learners,



strengthening the memory storage and retrieval needed to measure pre- and post-intervention changes in retention skills.

Operant Conditioning Theory

Another supporting theory is Operant Conditioning Theory (B.F. Skinner, 1954). Operant Conditioning Theory holds that voluntary behaviour is shaped and maintained by its consequences: behaviours followed by positive reinforcement or the removal of unpleasant stimuli are more likely to recur, while those followed by punishment decrease. Key principles include reinforcement, shaping, and chaining breaking complex skills into smaller steps and reinforcing each success to build competence. The framework emphasizes measurable, observable changes in behaviour and skill acquisition through structured consequence management.

The Shoebox Technique embodies this structured, sequential approach: its compartmentalized, step-by-step format allows teachers to systematically reinforce progress first recognition, then short-term recall, then application and association providing immediate, consistent positive reinforcement as learners successfully identify, retrieve, and associate items. This directly strengthens the responses targeted in the study's variables. The technique's clear start and finish also make progress visible and rewarding, creating natural reinforcement at task completion. This theoretical foundation underpins the expectation that improved retention will be observable and measurable, and guides how teachers can systematically support skill development and address challenges during implementation.

Information Processing Theory

The last supporting theory is Information Processing Theory (Atkinson & Shiffrin, 1968; Baddeley, 1986). Originally proposed as a three-stage model comprising sensory memory, short-term memory, and long-term memory, this framework explains how information is encoded, stored, and retrieved through a sequential flow of processing. Baddeley later significantly expanded the concept of short-term memory in 1986, re-conceptualising it not merely as a passive temporary store but as an active, multi-component working memory system made up of the central executive, phonological loop, visuospatial sketchpad, and episodic buffer. This expanded model describes how information is actively held, manipulated, and integrated with prior knowledge: the central executive acts as the supervisory controller that directs attention and allocates mental resources, while the phonological loop processes and maintains verbal and auditory information, the visuospatial sketchpad handles visual and spatial details a particular strength in ASD and the episodic buffer serves as a temporary interface that combines these different forms of information and links them to long-term memory. Ultimately, retention depends on effective attention, appropriate encoding strategies, regular rehearsal, and the meaningful transfer of information between memory stores.

The Shoebox Technique is deliberately designed to align with these processing stages and strengths: its visual presentation captures sensory attention; compartmentalization limits the amount of information presented at once, reducing overload on working memory; and repeated, consistent practice supports the transfer of information from short-term to long-term storage directly addressing the three retention dimensions in the study. Visually grouping related items also supports the visuospatial sketchpad and strengthens association, making encoding more effective. This alignment explains why structured, visual organization improves recognition/identification (effective encoding), short-term recall (optimized working-memory use), and application/association (strengthened links between stored information). The theory justifies measuring pre-post differences in retention as indicators of improved information processing, and informs how the Shoebox Technique can be refined to better support encoding and retrieval for learners with ASD.

Legal Bases

Republic Act No. 7277 – Magna Carta for Persons with Disabilities (1992, amended by RA 9442 and RA 10524). This landmark law defines the rights of persons with disabilities and declares it the State's duty to promote their full participation in society. It mandates accessible, relevant, and quality education at all levels, requiring schools to adapt curricula, methods, and resources according to individual needs rather than imposing a uniform system. It also enshrines the principle that persons with disabilities have the right to services that support their development, independence, and inclusion.



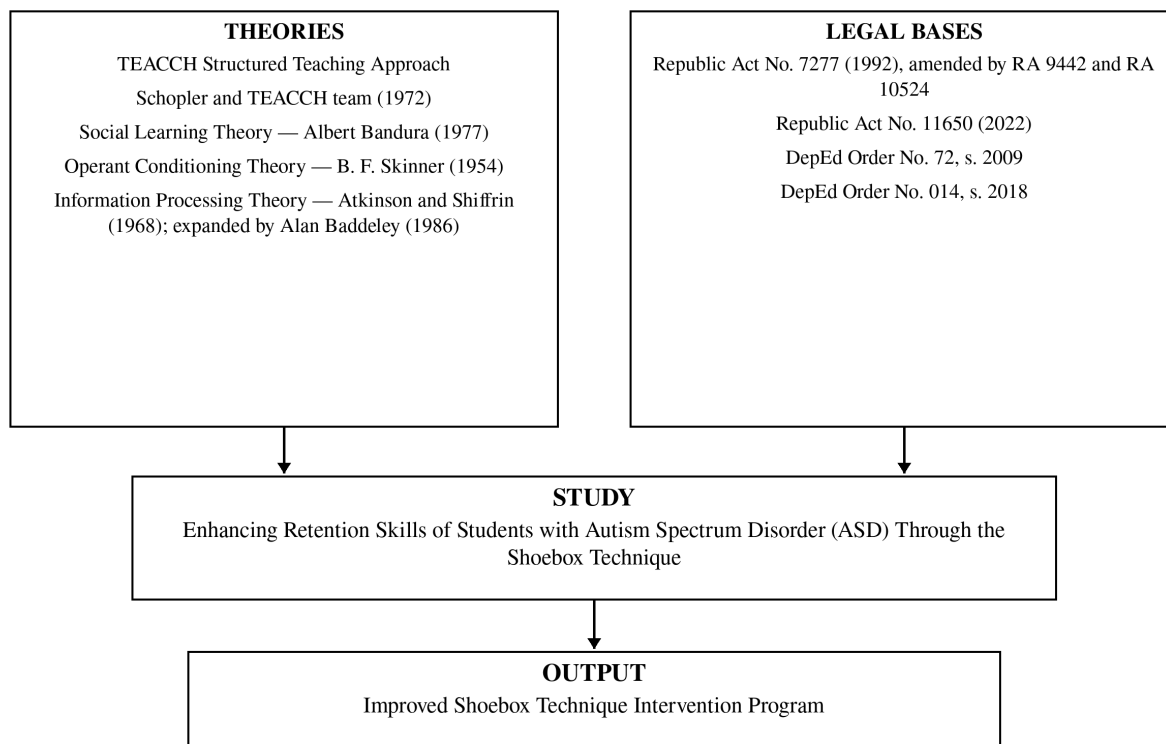
Republic Act No. 11650 – Inclusive Education Act (2022). This legislation formalizes inclusive education as the national policy, ensuring that all learners, including those with ASD, are educated alongside their peers in regular schools with appropriate support. It defines inclusive education as a system that respects diversity, removes barriers, and provides reasonable adjustments, assistive devices, and specialized interventions based on each learner’s profile. It further requires schools and educators to adopt evidence-based practices and to continuously improve instruction through research and innovation.

DepEd Order No. 72, s. 2009 – Inclusive Education as a Strategy for Ensuring Education for All Children with Disabilities. This Department of Education policy institutionalizes inclusive practices in all public schools, directing teachers to use differentiated instruction, varied materials, and adaptive approaches suited to each learner’s ability. It emphasizes that inclusion means removing barriers to learning and actively designing activities that allow all children to participate, progress, and achieve. It also encourages schools to explore, document, and share effective practices that address specific learning challenges.

DepEd Order No. 014, s. 2018 – Policy Guidelines on the Implementation of Special Education (SPED) Programs. This order sets national standards for special education services, requiring schools to use appropriate teaching-learning strategies, assessment tools, and intervention programs based on individual learner needs. It mandates that SPED programs be regularly reviewed, improved, and supported by research evidence to ensure quality and relevance. It also highlights the importance of fostering foundational skills such as memory, comprehension, and application for learners with diverse disabilities.

Figure 1

Theoretical and Conceptual Lenses of the Study



Related Studies

Northridge School (2021) defines shoebox tasks as self-contained, purpose-built activity kits holding all materials needed for a single task, designed to help learners complete work independently, connect concrete experiences to



abstract concepts, and build fine motor skills and coordination through actions such as sorting, stacking, assembling, and manipulating objects. While commercial versions can be costly, the guide notes that effective, low-cost alternatives can be created using everyday materials, making the approach accessible for classroom and home use.

Consistent with this framework, Misdayani and Hernawati (2023) developed and tested the Shoebox Program to address speech-language delays in young children with ADHD, noting that early, family-led intervention is key to minimizing developmental barriers. Using mixed methods, qualitative inquiry to shape the program and a single-subject research design to measure impact, the study assessed language skills before creating activities tailored to the child's needs, with parents trained to deliver the intervention under researcher guidance. Findings confirmed that the Shoebox Program effectively improved the child's speech-language abilities, demonstrating its suitability as a structured, home-implementable strategy to support skill development in neurodivergent learners.

Moving to skill retention among learners with ASD, Xing et al. (2024) used a quasi-experimental design to examine how fundamental movement skill training influences the acquisition and retention of physical activity levels and health-related fitness. Twenty-one participants were split: 11 received 12 weeks of structured training, while 10 followed standard physical activity routines. Post-intervention assessments and one-month follow-ups showed significant reductions in sedentary time, along with measurable improvements in body composition, muscle strength and endurance, and flexibility, gains that remained evident or continued to strengthen after the program ended. The study concludes that consistent, skill-focused interventions effectively support long-term retention of positive health behaviors and physical capabilities in this population.

In the same manner, Voyager Sopris Learning (2026) explains that learning disabilities, including those common alongside ASD, are neurological differences affecting how information is received, stored, and retrieved, rather than reflecting intelligence. The piece links retention struggles to challenges in short-term, working, and long-term memory, encoding, and retrieval, noting that verbal information is often especially difficult to process. It recommends structured, visual, and multisensory strategies such as chunking, explicit instruction, and predictable routines to reduce cognitive load and strengthen memory, directly supporting the use of tools like the Shoebox Technique to improve recognition, recall, and association skills.

Turning to existing classroom practices, Rance (2025) surveyed 50 SPED teachers in the Division of Davao del Norte to identify current teaching approaches for learners with ASD and inform a targeted training plan. Using descriptive research, the study found that educators commonly use visual supports, video modeling, positive reinforcement, and applied behavior analysis across social, behavioral, and academic domains; no significant differences in practice were linked to teacher age, gender, or position. The findings confirm that structured, visual-based strategies are already widely employed but highlight the need for continued professional development to strengthen delivery and expand evidence-based interventions suited to learners' needs.

Synthesis. All these studies converge on the core principle that structured, visual, and learner-centered interventions effectively support neurodivergent learners, yet they differ in scope, target groups, and focus areas. Northridge School (2021) and Misdayani and Hernawati (2023) establish the Shoebox approach as a practical, adaptable tool that fosters independence and skill development across settings. Xing et al. (2024) and Voyager Sopris Learning (2026) further confirm that such structured methods directly enhance retention by aligning with how learners process, store, and retrieve information. Rance (2025) and Aracena (2022) show that similar strategies are already part of inclusive practice but require refinement and targeted training to maximize impact. Meanwhile, Gomez (2015), Makarumbe and Walubita (2026), and Wakat (2026) expand the view to include monitoring, systemic factors, and implementation barriers that shape outcomes. Notably, no existing study has specifically investigated how the Shoebox Technique improves recognition, short-term recall, and association skills among learners with ASD in local inclusive settings a gap this research intends to fill.

Methodology

Research Design



This study employed a Quasi-Experimental Research Design, specifically the One-Group Pretest–Posttest Design. This design was appropriate because it assessed changes in outcomes among the same group of participants before and after exposure to an intervention, without a separate control group ideal for school-based inquiries where forming comparable groups was constrained by the limited number of eligible learners with ASD in a single setting (Fraenkel, Wallen, & Hyun, 2019).

In this study, retention skills were measured using validated assessment tools before the implementation of the Shoebox Technique (pretest). The intervention was then delivered over a set period, followed by a parallel posttest to measure changes in recognition and identification, short-term recall, and application and association. Comparing pretest and posttest scores determined whether significant improvements occurred that could be reasonably attributed to the intervention (Campbell & Stanley, 1963).

This design was selected because it aligned with the study’s goal of evaluating the effectiveness of a specific teaching strategy for a targeted group of learners. It allowed the researcher to control the delivery of the intervention while accounting for individual differences within the group, making it practical and ethical for inclusive education research (Creswell, 2014).

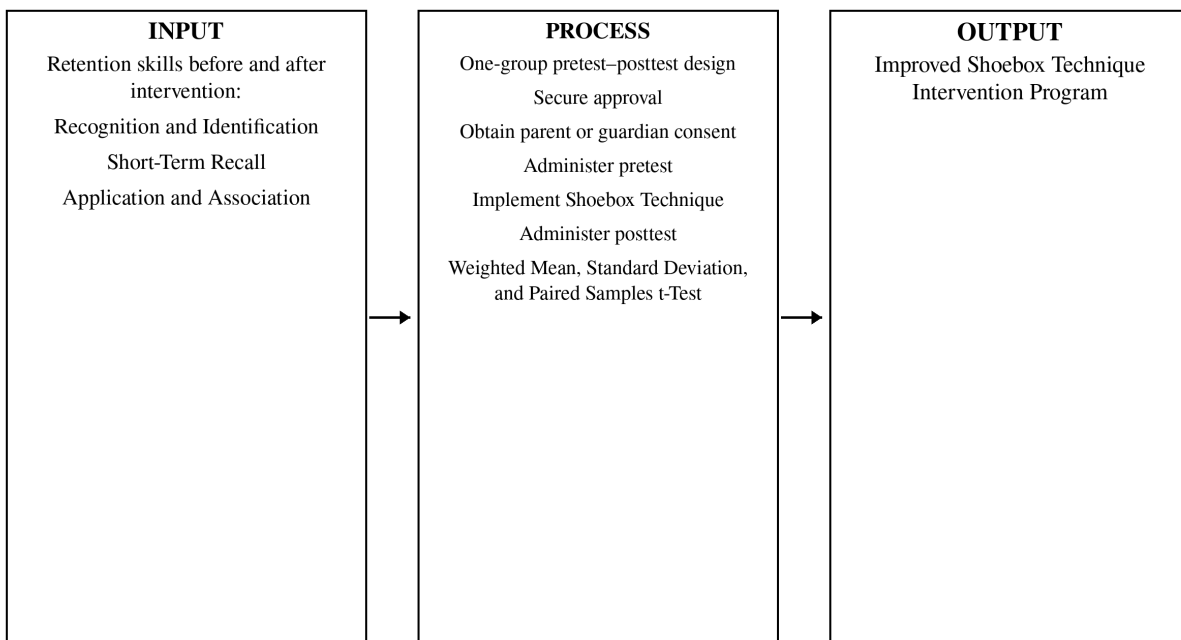
Flow of the Study

The input of the study consisted of the level of retention skills of learners with autism spectrum disorder before and after the implementation of the Shoebox Technique, specifically measured along three indicators: recognition and identification, short-term recall, and application and association. These baseline and post-intervention assessments served as the primary data needed to evaluate the intervention’s effect.

For the process, the study employed a Quasi-Experimental Research Design, particularly the one-group pretest–posttest design. The procedure began with securing approval from concerned authorities and obtaining informed consent from parents or guardians, followed by administering the pretest, implementing the Shoebox Technique over the designated period, conducting the posttest, and analyzing the gathered data using appropriate statistical treatments.

Figure 2

Input Process Output Model of the Study





Research Environment

This study was conducted at Marigondon Elementary School, located in Marigondon, Lapu-Lapu City. Classified as a big school under District Five, Division of Lapu-Lapu City, the institution is led by School Head Marichu M. Ligan, with Mercedita A. Sumalinog serving as Public Schools District Supervisor and Marilyn S. Andales as Schools Division Superintendent.

Marigondon Elementary School stands as a highly appropriate locale for this research for several key reasons. First, the school operates an established and functional Special Education (SPED) Center, offering dedicated programmes for learners with diverse needs. During earlier field engagements in the Special Education programme, the researcher observed that a substantial portion of the center's enrollees are diagnosed with autism spectrum disorder (ASD). This concentration of participants who match the study's target population ensures direct, accessible sampling and eliminates delays in identifying eligible learners. Second, the school administration has demonstrated strong commitment to inclusive education; the leadership actively supports innovation and has previously welcomed evidence-based practices designed to improve learning outcomes. This openness creates a conducive atmosphere for introducing and testing the Shoebox Technique.

Beyond participant availability, the school's physical and instructional environment is particularly well-suited to the Shoebox Technique. The SPED Center maintains dedicated learning spaces that are organized, familiar to the learners, and equipped with materials that can be adapted to hands-on, visual, and activity-based instruction core strengths of the Shoebox approach. The technique itself relies on concrete, low-cost, locally prepared learning kits that fit well within the school's resource context; it does not require specialized or expensive equipment, making it sustainable and replicable. Furthermore, the SPED teachers at the school already employ individualized and small-group instructional strategies, which align naturally with the Shoebox Technique's emphasis on differentiated learning, visual organization, and step-by-step task presentation. This existing practice base means the intervention can be integrated smoothly into daily routines rather than imposed as something entirely new.

Figure 3

Location Map and School Photograph of the Research Environment





Participants

The respondents of the study were the twenty-five (25) learners diagnosed with autism spectrum disorder who were officially enrolled at the Special Education (SPED) Center of Marigondon Elementary School during the conduct of the research.

The researcher employed purposive sampling in selecting the participants. This non-probability sampling technique involves the deliberate selection of individuals who meet specific criteria and directly correspond to the focus of the investigation, rather than choosing participants at random. Purposive sampling was deemed the most appropriate method for this study because the intervention the Shoebox Technique is designed specifically for learners with autism spectrum disorder; therefore, the study requires participants who exhibit the distinct learning profiles and needs associated with this condition. By including all twenty-five (25) formally identified and enrolled learners with ASD at the SPED Center, the researcher ensured that the sample accurately represented the target population. This approach also maximized the relevance and applicability of the findings, as the data gathered directly reflected the experiences and progress of the very group for whom the instructional strategy was intended. Given the specialized nature of the research and the relatively small, defined population of eligible learners, purposive sampling offered a focused, efficient, and ethically sound means of obtaining meaningful, context-specific results.

Table 1
Distribution of Respondents

ENVIRONMENT	FREQUENCY	PERCENTAGE %
Marigondon Elementary School	25	100
Total	25	100

Research Instrument

The primary data-gathering tool of this study was an adapted assessment instrument designed to measure the level of retention skills of learners with autism spectrum disorder before and after the implementation of the Shoebox Technique. The instrument was structured to evaluate three specific indicators: Recognition and Identification; Short-Term Recall; and Application and Association. It was adapted from the retention skills assessment developed and validated by Voyager Sopris Learning (2026), anchored also to the memory processing frameworks of An et al. (2025) and Main (2026).

In adapting the tool, the researcher made necessary adjustments and revisions to suit the specific objectives of this inquiry, match the developmental and functional levels of the participating learners, and align the items with the nature of tasks used in the Shoebox Technique, while preserving the original framework and validity of the source material. To further ensure content validity and appropriateness, the adapted instrument was validated by three experts: the School SPED Coordinator, a Master Teacher in Special Education, and the researcher's statistician. Their feedback guided final refinements before actual administration.

Data Collection

Pre-Data Gathering Stage. The first step the researcher took to organize the work was to secure approval from the Office of the Schools Division Superintendent (SDS) to conduct the research. Once approved, an endorsement letter signed by the SDS was forwarded to the Office of the Public Schools District Supervisor (PSDS) for further permission. Once signed, the researcher proceeded to the research environment and submitted the endorsement letter from the SDS and the confirmation letter from the PSDS to the school head of Marigondon Elementary School. Upon receiving positive confirmation from these authorities, the researcher met with the teachers of the learners with ASD, as they facilitated the administration of the assessment checklist to the respondents. An informal meeting was held during the teachers' free time to briefly explain the process and context of the study. Once agreement was reached,



the researcher distributed informed consent forms to formally request approval from the learners' parents. The consent document outlined all rights, the purpose and scope of the study, the procedures to be followed, the voluntary nature of participation, and the right to withdraw at any time.

Data Gathering Stage. After securing all necessary approvals from the Schools Division Superintendent, Public Schools District Supervisor, and School Head, as well as obtaining informed consent from the participants' parents or guardians and completing the validation of the adapted research instrument, the researcher proceeded with the actual data collection process. The researcher coordinated with the teachers assigned at the SPED Center of Marigondon Elementary School to orient them regarding the study's objectives and the implementation plan.

The researcher directly facilitated learning sessions for the identified learners with ASD over a period of two weeks. Prior to the intervention, the pretest was administered to determine the baseline level of the learners' retention skills in terms of recognition and identification, short-term recall, and application and association. Once the initial assessment was completed, the Shoebox Technique was systematically implemented as the primary intervention. Throughout the delivery of the strategy, the researcher also observed and documented the learners' level of attention and engagement alongside the target retention indicators. After the designated implementation period, the posttest was administered to measure changes and improvements in the same retention skill areas.

Post-Data Gathering Stage. Upon completion of the study, data were retrieved, compiled, and organized systematically. The researcher checked all completed assessment checklists for completeness and consistency, then tabulated the scores for both pre-intervention and post-intervention results across the three indicators: recognition and identification, short-term recall, and application and association. The gathered data were subjected to statistical treatment using the Weighted Mean, Standard Deviation, and Paired Samples t-Test to determine the level of retention skills and any significant difference brought about by the Shoebox Technique. The results were interpreted, analyzed, and presented in tables and narrative form. Based on the findings, the improved Shoebox Technique Intervention Program was formulated. Finally, all records and data were kept confidential and stored securely, and were disposed of appropriately six months after the completion of the study.

Ethical Considerations

This study was reviewed and approved by the Chairman and panel members of the Graduate School at Cebu Technological University. For data privacy, all recorded audio files and related documents obtained from the participants were permanently deleted six months after the completion of the study. Regarding academic integrity, artificial intelligence was used only minimally and with careful consideration, solely for reference and language polishing purposes. No plagiarism was committed, and all ideas and sources used were properly credited.

Statistical Treatment and Scoring

The Weighted Mean was computed to determine the level of retention skills of the learners before and after the implementation of the Shoebox Technique in terms of Recognition and Identification, Short-Term Recall, and Application and Association.

The Standard Deviation was calculated to measure the dispersion or homogeneity of the scores, showing how consistent the learners' performance was across each indicator. The computed mean values were interpreted using a standard descriptive rating scale.

The Paired Samples t-Test was used to determine if there was a statistically significant difference between the pre-intervention and post-intervention retention skill scores. This tool was appropriate because the same group of participants was assessed before and after the intervention under the one-group pretest–posttest design. The hypothesis was tested at the 0.05 level of significance to establish whether the observed improvements could be reasonably attributed to the Shoebox Technique.



To interpret the level of retention skills of the learners before and after the implementation of the Shoebox Technique, the following numerical and descriptive rating scale were used. The scores obtained from the assessment checklist were computed to determine the weighted mean, which were interpreted using the guide below:

Table 2

Retention Skills Rating Scale

Scale	Numerical Range	Verbal Description	Descriptive Interpretation
5	4.21 – 5.00	Always Observed	The learner consistently demonstrates the skill, indicating that retention in terms of recognition and identification, short-term recall, and application and association is fully achieved and highly evident.
4	3.41 – 4.20	Often Observed	The learner frequently demonstrates the skill, indicating that retention is generally evident and satisfactorily achieved across the assessed indicators.
3	2.61 – 3.40	Sometimes Observed	The learner demonstrates the skill on certain occasions only, indicating that retention is developing but still inconsistent depending on the task or situation.
2	1.81 – 2.60	Rarely Observed	The learner seldom demonstrates the skill, indicating that retention is minimally achieved and requires further support and practice.
1	1.00 – 1.80	Never Observed	The learner does not demonstrate the skill, indicating that retention is not yet achieved and needs targeted intervention.

Findings

The results describe retention skills among the 25 learners before and after the Shoebox Technique intervention.

Pre-intervention Retention Skills

Table 3

Recognition and Identification Before Intervention

Indicators	WM	SD	VD
1. Correctly points to or names the object or picture taken from the shoebox.	2.1	0.9	RO
2. Identifies which item matches the card or example shown inside the box.	2.35	0.75	RO
3. Picks out the correct item from among other objects inside the shoebox.	2.05	0.83	RO
4. Picks out the correct item from among other objects inside the shoebox.	1.85	0.81	RO
5. Matches identical objects or pictures and places them in the same compartment.	2.15	0.81	RO
6. Identifies colors, shapes, or categories of items found in the shoebox.	2.25	0.77	RO
7. Recognizes the order or arrangement of items inside the shoebox.	2.2	0.83	RO
8. Selects the right item when asked “Which one goes here?” or “Show me the...”.	2.35	0.81	RO
9. Still identifies items even if they are moved to a different compartment.	2.4	0.82	RO
10. Shows familiarity and responds appropriately when the same items reappear.	2.3	0.86	RO



Indicators	WM	SD	VD
Overall	2.2	0.82	

Table 3 reveals the Recognition and Identification skills of learners with ASD before the Shoebox Technique intervention. The highest mean score was 2.40, observed in identifying items even when moved to a different compartment. This was followed by two indicators at 2.35: identifying matching items and selecting the correct item when given verbal prompts. Meanwhile, the lowest mean score was 1.85, recorded in picking out the correct item from among other objects. All indicators fell within the Rarely Observed (RO) range, yielding an overall mean of 2.20.

Note. WM = weighted mean; SD = standard deviation; VD = verbal description; RO = rarely observed.

Table 4

Short-term Recall Before Intervention

Indicators	WM	SD	VD
1. Recalls and names the object or picture shown inside the shoebox moments ago.	2.15	0.81	RO
2. Remembers the instruction given before opening or using the shoebox.	1.9	0.85	RO
3. Recalls the correct order of items arranged inside the shoebox.	2.0	0.73	RO
4. Remembers what task or activity was done with the shoebox earlier.	1.95	0.83	RO
5. Recalls two to three items or details taken from the shoebox set.	2.25	0.91	RO
6. Finds or retrieves the right item from memory without looking at examples.	2.05	0.69	RO
7. Repeats the sequence of actions done with the shoebox materials.	1.95	0.83	RO
8. Remembers which compartment an object was placed in.	2.0	0.73	RO
9. Recalls the main item or concept presented using the shoebox.	2.15	0.81	RO
10. Holds information in mind long enough to finish the shoebox task.	2.2	0.83	RO
Overall	2.06	0.80	RO

Table 4 reveals the Short-term Recall skills of learners with ASD before the Shoebox Technique intervention. The highest mean score was 2.25, observed in recalling two to three items or details taken from the shoebox set. This was followed by holding information in mind long enough to finish the shoebox task at 2.20, and by recalling and naming the object or picture shown moments ago and recalling the main item or concept, both at 2.15. Meanwhile, the lowest mean score was 1.90, recorded in remembering the instruction given before opening or using the shoebox. All indicators fell within the Rarely Observed (RO) range, yielding an overall mean of 2.06.

Note. WM = weighted mean; SD = standard deviation; VD = verbal description; RO = rarely observed.

Table 5

Application and Association Before Intervention

Indicators	WM	SD	VD
1. Places each object or picture in the correct compartment based on its use.	2.6	0.68	RO
2. Puts together items that belong to the same group or category.	2.2	0.83	RO
3. Uses what was learned to complete a similar sorting or matching task.	2.3	0.86	RO



Indicators	WM	SD	VD
4. Groups items according to type such as food, animals, or school supplies.	2.05	0.76	RO
5. Links a picture or symbol to the actual object inside the shoebox.	2.35	0.75	RO
6. Applies the same rule or skill to a new set of items in the shoebox.	2.2	0.83	RO
7. Associates items based on shared features like color, shape, or purpose.	1.95	0.76	RO
8. Uses remembered information to decide where items should go.	2.05	0.83	RO
9. Connects previous shoebox activities to the task being done now	2.05	0.89	RO
10. Relates and uses stored information to finish the task meaningfully.	2.2	0.77	RO
Overall	2.2	0.8	RO

Table 5 reveals the Application and Association skills of learners with ASD before the Shoebox Technique intervention. The highest mean score was 2.60, observed in placing each object or picture in the correct compartment based on its use. This was followed by linking a picture or symbol to the actual object inside the shoebox at 2.35, and using what was learned to complete a similar sorting or matching task at 2.30. Meanwhile, the lowest mean score was 1.95, recorded in associating items based on shared features like color, shape, or purpose. All indicators fell within the Rarely Observed (RO) range, yielding an overall mean of 2.20.

Note. WM = weighted mean; SD = standard deviation; VD = verbal description; RO = rarely observed.

Post-intervention Retention Skills

Table 6

Recognition and Identification After Intervention

Indicators	WM	SD	VD
1. Correctly points to or names the object or picture taken from the shoebox.	4.1	0.85	OO
2. Identifies which item matches the card or example shown inside the box.	3.85	0.88	OO
3. Picks out the correct item from among other objects inside the shoebox.	3.7	0.73	OO
4. Picks out the correct item from among other objects inside the shoebox.	3.7	0.66	OO
5. Matches identical objects or pictures and places them in the same compartment.	3.4	0.60	OO
6. Identifies colors, shapes, or categories of items found in the shoebox.	3.9	0.85	OO
7. Recognizes the order or arrangement of items inside the shoebox.	3.85	0.81	OO
8. Selects the right item when asked "Which one goes here?" or "Show me the...".	3.55	0.76	OO
9. Still identifies items even if they are moved to a different compartment.	3.5	0.76	OO
10. Shows familiarity and responds appropriately when the same items reappear.	3.7	0.8	OO
Overall	3.73	0.77	OO

Table 6 reveals the Recognition and Identification skills of learners with ASD after the Shoebox Technique intervention. The highest mean score was 4.10, observed in correctly pointing to or naming the object or picture taken from the shoebox. This was followed by identifying colors, shapes, or categories of items at 3.90, and both identifying which item matches the card and recognizing the order of items at 3.85. Meanwhile, the lowest mean score was 3.40,



recorded in matching identical objects or pictures and placing them in the same compartment. The overall dimension was described as Often Observed (OO), yielding an overall mean of 3.73.

Note. WM = weighted mean; SD = standard deviation; VD = verbal description; OO = often observed.

Table 7

Short-term Recall After Intervention

Indicators	WM	SD	VD
1. Recalls and names the object or picture shown inside the shoebox moments ago.	3.65	0.75	OO
2. Remembers the instruction given before opening or using the shoebox.	4.0	0.79	OO
3. Recalls the correct order of items arranged inside the shoebox.	3.8	0.89	OO
4. Remembers what task or activity was done with the shoebox earlier.	3.85	0.93	OO
5. Recalls two to three items or details taken from the shoebox set.	3.9	0.91	OO
6. Finds or retrieves the right item from memory without looking at examples.	4.0	0.79	OO
7. Repeats the sequence of actions done with the shoebox materials.	3.8	0.70	OO
8. Remembers which compartment an object was placed in.	3.75	0.72	OO
9. Recalls the main item or concept presented using the shoebox.	3.8	0.83	OO
10. Holds information in mind long enough to finish the shoebox task.	3.7	0.66	OO
Overall	3.83	0.80	OO

Table 7 reveals the Short-term Recall skills of learners with ASD after the Shoebox Technique intervention. The highest mean scores were 4.00, observed in remembering the instruction given before opening or using the shoebox and in finding or retrieving the right item from memory without looking at examples. This was closely followed by recalling two to three items or details from the set at 3.90, and remembering what task or activity was done earlier at 3.85. The lowest mean score was 3.65, recorded in recalling and naming the object or picture shown inside the shoebox moments ago. The overall dimension was described as Often Observed (OO), yielding an overall mean of 3.83.

Note. WM = weighted mean; SD = standard deviation; VD = verbal description; OO = often observed.

Table 8

Application and Association After Intervention

Indicators	WM	SD	VD
1. Places each object or picture in the correct compartment based on its use.	3.5	0.69	OO
2. Puts together items that belong to the same group or category.	3.65	0.81	OO
3. Uses what was learned to complete a similar sorting or matching task.	3.75	0.85	OO
4. Groups items according to type such as food, animals, or school supplies.	3.65	0.67	OO
5. Links a picture or symbol to the actual object inside the shoebox.	3.8	0.83	OO
6. Applies the same rule or skill to a new set of items in the shoebox.	3.7	0.80	OO
7. Associates items based on shared features like color, shape, or purpose.	3.55	0.76	OO
8. Uses remembered information to decide where items should go.	3.8	0.89	OO
9. Connects previous shoebox activities to the task being done now	3.3	0.47	OO



Indicators	WM	SD	VD
10. Relates and uses stored information to finish the task meaningfully.	4.05	0.83	OO
Overall	3.68	0.76	OO

Table 8 reveals the Application and Association skills of learners with ASD after the Shoebox Technique intervention. The highest mean score was 4.05, observed in relating and using stored information to finish the task meaningfully. This was followed by two indicators at 3.80: linking a picture or symbol to the actual object inside the shoebox and using remembered information to decide where items should go. Meanwhile, the lowest mean score was 3.30, recorded in connecting previous shoebox activities to the task being done now. The overall dimension was described as Often Observed (OO), yielding an overall mean of 3.68.

Note. WM = weighted mean; SD = standard deviation; VD = verbal description; OO = often observed.

Summary of Pre-intervention and Post-intervention Skills

Table 9

Summary of Retention Skills Before and After Intervention

Indicators	WM (Before)	VD	WM (After)	VD	Mean Difference
Recognition and Identification	2.2	RO	3.73	OO	1.53
Short-term Recall	2.06	RO	3.83	OO	1.77
Application and Association	2.2	RO	3.68	OO	1.48
Overall	2.15	RO	3.75	OO	1.6

Table 9 presents the summary of retention skills of the learners before and after the Shoebox Technique intervention across the three dimensions. Before the intervention, Recognition and Identification obtained a Weighted Mean of 2.20, described as Rarely Observed (RO); Short-term Recall registered 2.06, also Rarely Observed (RO); and Application and Association yielded 2.20, likewise Rarely Observed (RO). After the intervention, Recognition and Identification rose to 3.73 (Often Observed, OO); Short-term Recall increased to 3.83 (Often Observed, OO); and Application and Association improved to 3.68 (Often Observed, OO). The computed mean differences were 1.53 for Recognition and Identification, 1.77 for Short-term Recall, and 1.48 for Application and Association. Collectively, the overall pre-intervention mean of 2.15 (RO) rose to an overall post-intervention mean of 3.75 (OO), registering an overall mean difference of 1.60.

The consistent rise across all skill dimensions indicates substantial improvement in retention skills following the intervention. Short-term Recall posted the highest increase, suggesting that the structured routines, clear visual cues, and predictable sequences of the Shoebox Technique most strongly supported the learners' ability to hold and retrieve information over brief periods. Recognition and Identification and Application and Association also showed marked gains, demonstrating that the intervention equally strengthened the learners' capacity to identify items, form meaningful connections, and apply knowledge across related tasks. The uniformly large mean differences reflect a consistent pattern of improvement across all skill areas, showing that learners moved from demonstrating skills only rarely to displaying them often. Test of Significant Difference



Table 10

Paired Comparisons of Retention Skills Before and After Intervention

Indicators	Before Mean	After Mean	Mean Difference	t-value	p-value	Decision	Interpretation
Recognition and Identification	2.2	3.73	1.53	18.66	<0.001	Reject H_0	There is a significant difference
Short-term Recall	2.06	3.83	1.77	26.19	<0.001	Reject H_0	There is a significant difference
Application and Association	2.2	3.63	1.48	16.15	<0.001	Reject H_0	There is a significant difference
Overall Weighted Mean	2.15	3.75	1.6	20.3	<0.001	Reject H_0	There is a significant difference

Table 10 presents the statistical test of significant difference comparing the retention skill levels before and after the Shoebox Technique intervention. For Recognition and Identification, the pre-intervention mean of 2.20 rose to a post-intervention mean of 3.73, yielding a mean difference of 1.53, a computed t-value of 18.66, and a p-value below 0.001. For Short-term Recall, the pre-intervention mean of 2.06 increased to 3.83, with a mean difference of 1.77, a t-value of 26.19, and a p-value below 0.001. For Application and Association, the pre-intervention mean of 2.20 improved to 3.63, registering a mean difference of 1.48, a t-value of 16.15, and a p-value below 0.001. Collectively, the overall pre-intervention mean of 2.15 rose to 3.75, with an overall mean difference of 1.60, a t-value of 20.30, and a p-value below 0.001. In all dimensions, the decision was to reject the null hypothesis, leading to the interpretation that a significant difference existed.

Output of the Study

This program is designed to address the retention learning needs of learners with autism spectrum disorder (ASD) using the Improved Shoebox Technique a structured, visual, and activity-based intervention adapted to match how learners with ASD best process, retain, and apply information. Grounded on the TEACCH Structured Teaching Approach, Information Processing Theory, and Operant Conditioning principles, and validated through empirical findings, this program transforms ordinary materials into organized learning kits that reduce confusion, build independence, and systematically develop retention skills in recognition, recall, and application. It is aligned with the DepEd K-12 Inclusive Education Framework and may be implemented alongside regular classroom instruction or as a targeted intervention in special education settings.

The program includes learning kits for recognition and identification, short-term recall, and application and association. Its proposed implementation spans 16 weeks, with preparation, pre-assessment, intervention, post-assessment, and evaluation and refinement. Progress is measured using the same assessment tool at pre- and post-intervention stages to determine changes in recognition and identification retention, short-term recall retention, and application and associative retention. Consistent implementation is tracked through session logs and observation notes. Program effectiveness is evaluated based on measurable improvement, learner independence, and skill generalization across settings, ensuring that the program remains evidence-based, responsive, and sustainable directly reflecting the study's finding that structured visual organization and predictable practice produce reliable gains in retention. The Improved Shoebox Technique Intervention Program uses affordable, locally available materials, making it accessible for classroom and home use an important quality highlighted by the study's consistent results across all skill areas. It may be integrated into the school's regular inclusive education plan, shared with other schools, and adapted across grade levels and skill domains. Training and orientation guides may be developed to enable wider adoption, helping



more educators provide structured, evidence-based support that strengthens retention skills for learners with ASD and similar learning needs.

Table 11

Learning Kits of the Improved Shoebox Technique Intervention Program

Component	Learning Kits (Shoebox Sets)	Learning Kits (Shoebox Sets)	Learning Kits (Shoebox Sets)
Learning Kit / Set	Set A Recognition and Identification	Set B Short-Term Recall	Set C Application and Association
Primary Focus	Recognize, name, and identify items reliably across varied presentations	Hold, retain, and retrieve information from memory	Group, link, and generalize skills across related tasks
Key Activities	Point and name; match to example; select from group; identify color, shape, and category; recognize arrangements even when items are moved	Recall shown items; remember instructions; follow sequences; remember placement and location; hold information long enough to complete tasks	Sort by category; link picture/symbol to real object; apply rules to new items; connect past activities to present task; use stored information meaningfully
Design Features	Clearly defined compartments; consistent arrangement; concrete, familiar materials; visual cues; reduced clutter	Step-by-step visual guides; fixed positions; limited items per set; progressive difficulty; repetition built into routine	Cross-set matching materials; graduated similarity levels; real-life reference objects; open-ended task extensions
Implementation Frequency	3–4 sessions weekly	3–4 sessions weekly	3–4 sessions weekly
Materials Used	Visual cards; real objects; color/shape samples; sorting mats	Memory cards; sequence strips; location markers; visual schedules	Object–picture pairs; category labels; generalized item sets; connection charts
Target Skill Dimension	Recognition and Identification	Short-Term Recall	Application and Association
Support to Learners with ASD	Consistent visual structure reduces distraction; clear compartments guide organization; predictable layout builds confidence	Visual anchors and consistent placement strengthen memory encoding; reduced cognitive load frees mental capacity for retention	Explicit links between familiar and new materials build transferable skills; consistent structure supports confident generalization to novel examples
Expected Outcome	Learners correctly identify and name items consistently across presentations	Learners accurately recall items, locations, and instructions without constant prompting	Learners independently apply learned rules and associations to new situations and unfamiliar items



Table 12

Proposed Scheme of Implementation

Phase	Period	Activities	Responsible
Phase 1 — Preparation	Week 1	Construct shoebox kits; gather and organize materials; orient teachers and parents	SPED Teachers, School Head
Phase 2 — Pre-Assessment	Week 2	Establish baseline performance across all three retention skill areas	SPED Teachers
Phase 3 — Intervention	Weeks 3–14	Implement Shoebox Technique sessions following Set A → Set B → Set C progression	SPED Teachers / Parents
Phase 4 — Post-Assessment	Week 15	Re-evaluate retention skill levels; measure improvement	SPED Teachers
Phase 5 — Evaluation & Refinement	Week 16	Review results; adjust activities; plan sustained use and expansion	School Head, Teachers, Stakeholders

Discussion

The marked improvement from pre- to post-intervention implies that learners with ASD substantially enhanced their ability to recognize, identify, and match objects and visual examples. They became notably more proficient in naming items and identifying categories, demonstrating that structured visual cues and consistent practice strengthened their recognition skills and reduced dependence on exact placement or familiar context. The consistently moderate standard deviation values indicate that performance improved steadily across the group, showing that gains were shared rather than limited to only some learners.

The substantial improvement from pre- to post-intervention implies that learners with ASD notably strengthened their ability to hold instructions, details, and task information in short-term memory. The especially strong gains in remembering verbal instructions and retrieving items independently from memory show that the structured, predictable routines of the Shoebox Technique successfully supported working memory and reduced the need for constant visual prompts. Moderate standard deviation values across indicators confirm that improvements were consistent throughout the group, reflecting shared progress in retaining and recalling information over short periods.

The substantial improvement from pre- to post-intervention implies that learners with ASD notably enhanced their ability to categorize items, form meaningful connections, and apply learned skills to new situations. The especially strong gain in using stored information meaningfully demonstrates that the Shoebox Technique effectively helped learners transfer knowledge across tasks, while the comparatively lower score in linking across different activities suggests that building connections between separate lessons required additional time and practice. Moderate standard deviation values show consistent progress across the group, reflecting shared improvement in forming associations and applying skills purposefully.

The theoretical framework links these changes to visual organization, predictable routines, guided modeling, repeated practice, and reinforcement. TEACCH emphasizes physical structure and organized task presentation; Social Learning Theory emphasizes attention, retention, reproduction, and motivation; Operant Conditioning emphasizes reinforcement and step-by-step shaping; and Information Processing Theory emphasizes encoding, working-memory support, storage, and retrieval. These principles informed the design of the Shoebox Technique and the improved intervention program.

It is recommended that the Shoebox Technique intervention be adopted and utilized by schools and inclusive education teachers as a structured instructional strategy to systematically strengthen retention skills among learners with ASD, integrating its consistent visual organization, clear grouping, and predictable activity design into daily lessons and



routines to ensure regular, sustained implementation across settings. School administrators should support its institutional use through resource allocation and capacity-building, particularly emphasizing how visual structure and repeated practice help address working-memory and associative challenges that learners commonly face. Parents are encouraged to apply the adapted program at home to reinforce skills and help learners connect knowledge across different environments, strengthening the meaningful application of what has been learned. Curriculum developers may further refine the program into a standardized resource guide to expand its scope and accessibility, making clear grouping structures and visual supports easier to adapt to varied needs. Future researchers are advised to validate its impact across broader populations and longer periods to fully establish its value as an evidence-based inclusive intervention that supports recognition, recall, and flexible use of information.

Conclusion

Retention skills increased following the Shoebox Technique intervention among the participating learners with ASD. Overall performance moved from rarely observed before intervention to often observed after intervention, with statistically significant reported paired comparisons across all three measured dimensions. The findings support the use of structured visual organization, clear grouping, and predictable routines in recognition, recall, and associative learning activities. The resulting Improved Shoebox Technique Intervention Program provides an accessible approach for classroom and home settings. Further evaluation across broader populations and longer periods is recommended, as stated in the thesis.

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