

## Overview

As the population ages, the number of persons living with dementia (PLWDs) rises, **increasing pressure on the care sector**. Traditional models often overlook PLWDs' cognitive needs, leading to cognitive decline, social withdrawal, and depression.

All Saints Home (ASH) addressed this by implementing a **Humanoid-enabled Cognitive Training Programme** in its Tampines (TP), Hougang (HG) and Yishun (YS) centres. This evidence-based, multi-tiered programme uses audio-visual cues in multiple languages and **engages residents with moderate-to-severe dementia** in cognitive games.

Over six months, residents participated in three weekly sessions, showing **improvements in engagement and cognitive performance in the areas of visual scanning, attention, and working memory**.

## Problem

The widespread misconception that PLWD are incapable of cognitive improvement leads to a lack of cognitive training opportunities, resulting in disengagement and an accelerated decline in cognitive function.

Adoption of innovative humanoid-enabled cognitive training remains limited despite its encouraging results due to shortage of trained manpower and limited access to technology. Thus, many individuals are deprived of interventions that could enhance their quality of life.

Addressing this gap is crucial to **reshaping dementia care**; integrating technology-driven solutions can empower individuals to maintain cognitive function and engagement despite limited resources.

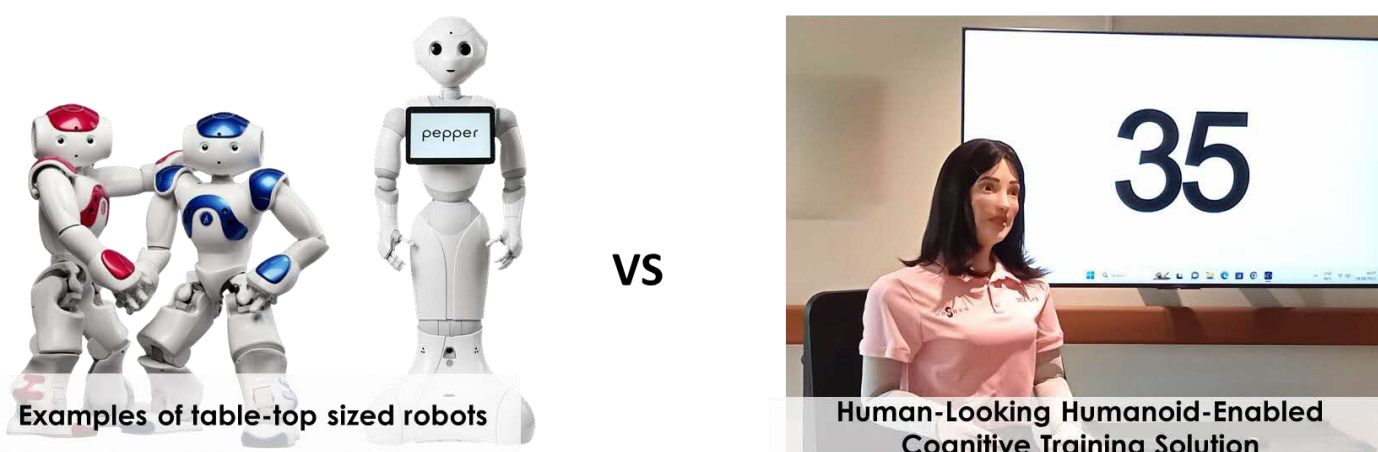
The problem has several contributing factors:

1. Gap in cognitive training prioritisation
2. Lack of technology-enabled interventions in the sector
3. Staffing constraints and competency/language gaps
4. Unequal access to engagement based on resident condition
5. Large extent of disengagement

These factors highlights the need for a **structured, scalable programme** that provides **consistent cognitive training and engagement without requiring additional manpower**.

## Innovation

ASH considered various cognitive engagement solutions including the use of virtual platforms (TV/iPad) and "table-top" robots. ASH decided on the Humanoid-Enabled Cognitive Training solution for the following reasons:



- 1. Structured and Manpower-Efficient:** Provides consistent therapeutic facilitation in multiple languages, with visual and audio cues, allowing residents to engage optimally without constant human supervision. It also enables staff to manage larger groups or focus on targeted therapy and can facilitate continuous resident engagement during COVID outbreaks.
- 2. Promote Lasting Engagement:** Research indicates that physical embodiment of human-like humanoids elicits more active responses from seniors as compared to virtual/"table-top" solutions, promoting lasting positive engagement.
- 3. Proven Adoption across Care Spectrum:** The programme has been successfully implemented in 17 care sites in Singapore (including ASH), across various care settings and is recognized as a sustainable solution for cognitive training amidst workforce constraints.
- 4. Available Enhancements for Long-term Usage:** Future upgrades will include more interactive cognitive games, psychomotor exercises, and support in various dialects to enhance engagement.

## Implementation

The programme was implemented for over 6 months across 3 ASH centres (TP, HG and YS), starting with 37 residents with dementia to 176 as of Jan 2025.

It was implemented as a group intervention in activity spaces, gyms and bedside for residents who are bed-bound/spend prolong time in bed.



## Impact

### Resident Impact

The quality of resident engagement across 3 sites show an average increase of 35% in positive engagement across all sites (Table 1) after a 6-month exposure to the programme.

Residents' cognitive performance also improved by 45% on average in visual scanning, attention and working Memory across 3 sites (Table 2) after the 6-month exposure to the programme.

	Impact on Quality of Resident Engagement			
	Positive Engagement		Negative/Passive Engagement	
	Pre	Post	Pre	Post
ASH TP	40.5%	69.0%	59.5%	31.0%
ASH HG	34.5%	74.0%	65.5%	26.0%
ASH YS	24.0%	61.0%	76.0%	39.0%

	Impact on Resident Cognitive Performance: Visual Scanning		
	Improved	No change	Decline
ASH TP	73.0%	9.0%	18.0%
ASH HG	46.0%	15.0%	39.0%
ASH YS	31.0%	38.0%	31.0%



	Impact on Resident Cognitive Performance: Attention		
	Improved	No change	Decline
ASH TP	73.0%	18.0%	9.0%
ASH HG	54.0%	15.0%	31.0%
ASH YS	23.0%	54.0%	23.0%

	Impact on Resident Cognitive Performance: Working Memory		
	Improved	No change	Decline
ASH TP	60.0%	40.0%	0.0%
ASH HG	33.0%	34.0%	33.0%
ASH YS	18.0%	64.0%	18.0%

### Manhour Productivity Gain

After 6-months, group activities required 3.2 fewer manhours per day and also required lower staff headcount per session (Table 3).

The implementation of the programme created:  
 Innovation in Cognitive Training and Facilitation Approach  
 Manpower Resource Efficiency and Optimisation  
 Improvement in Resident Engagement and Cognitive Function

The programme has provided a structured and efficient approach to delivering cognitive training for PLWDs, and has shown evidence of improvements to positive engagement and cognitive performance while minimising the strain on the limited workforce.

	Total manhours involved in conducting group activities per day			Staff-to-Resident Ratio per group activity session	
	Pre	Post	Gain	Pre	Post
ASH TP	10.5 h	7.3 h	3.2 h (30% ↓)	1:5	1: 8-10
ASH HG	7.0 h	4.7 h	2.3 h (33% ↓)	1:7	1:10-15
ASH YS	11.8 h	7.8 h	4.0 h (34% ↓)	1:5	1: 7-8



## System-Level Outcomes

### Enhanced Access and Health Outcomes of Cognitive Training

This programme increased access to cognitive training and positive health outcomes such as improved cognitive performance and positive engagement, for **176 PLWDs at ASH and counting**.

### Sector-Wide Impact

This programme has been implemented across 17 service sites (nursing homes, centre-based services and community hospitals), broadening sector-wide access to structured, evidence-based cognitive training, which tends to be limited in traditional care models.