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Abstract

Purpose: To examine memory support staff perspectives during early integration of a humanoid companion robot in a residential memory care neighborhood.

Methods: A qualitative descriptive design was used in a memory care neighborhood in Northern California. Data were collected from 15 staff participants through one pre-implementation focus group (n=15) and three follow-up individual interviews. Interviews were conducted before and during the first 8 weeks of the robot's introduction and were audio-recorded and transcribed verbatim. Six interdisciplinary team members performed thematic analysis through collaborative coding and team-based comparisons.

Results: Three themes emerged: Dynamics of Implementation Sense-Making, Ambivalent Imaginaries of the Robot, and Situated Interaction Work and Operational Burden. Staff reported varied readiness, recognized both promise and limitations, and emphasized the need for staff as ongoing intermediaries between the robot and residents during use.

Conclusions/Implications: Humanoid companion robots may support social engagement in memory care; however, effective implementation requires staff preparation, technological refinement, and alignment with person-centered care.

Key Words: socially assistive robots, humanoid companion robots, dementia care, residential memory care, human-robot interaction, staff perspectives, implementation, person-centered care, generative artificial intelligence

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Humanoid Companion Robots in Memory Care: Staff Perceptions

During Early Implementation

Older adults with Alzheimer's disease and related dementias (ADRD) often encounter behavioral and psychological symptoms requiring consistent, person-centered care (National Academies of Sciences, Engineering, and Medicine, 2021). Socially assistive robots have emerged as innovative technologies to support such care, with evidence suggesting benefits for socioemotional engagement, companionship, and psychological well-being (Chen et al., 2024; Kim et al., 2025). These robots typically simulate animal-like behaviors, facilitate conversation, and support reminiscence (Chen et al., 2024; Kim et al., 2025; Papadopoulos et al., 2022; Yuan et al., 2023). Robots such as PARO, Pepper, and Hyodol have shown potential to alleviate depression and loneliness while enhancing social interaction across dementia stages (Chen et al., 2024; Kim et al., 2025; Yuan et al., 2023).

Despite these benefits, social robots are still developing systems, and they are still dependent on human oversight for safe, ethical use (Olatunji et al., 2026). In dementia care settings direct care staff, support staff, and administrators are key to implementation success (Yuan et al., 2022), serving as intermediaries who evaluate robot integration into workflows and maintain care standards. Staff perspectives on social robot use in memory care settings remain mixed. Some report reduced job stress and enhanced resident engagement (Liao et al., 2023; Yuan et al., 2022), while others raise concerns about privacy, ethics, workload, and job displacement (Liao et al., 2023; Papadopoulos et al., 2022). Existing research primarily focuses on short-term effects (Liao et al., 2023; Papadopoulos et al., 2022) and lacks longitudinal examination of staff perceptions, particularly in U.S. residential care settings using humanoid companion robots.

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This research brief reports preliminary qualitative findings from a 12-month mixed-methods study investigating facilitators and barriers to adopting a humanoid companion robot in a Northern California memory care neighborhood. Findings focus on staff perspectives during the first eight weeks of the implementation.

Methods

Study Design

The broader study evaluates whether a humanoid companion robot can support resident engagement and psychosocial well-being while examining its impact on staff workflows. The goal is to inform the responsible implementation of emerging technologies in person-centered dementia care. The robot is an artificial intelligence (AI)-enabled, colorful, three-foot-tall humanoid companion system with arms and one hand with five fingers, while the distal end of the other arm is a bubble blower. The robot has legs (on wheels) and round head that tilts, with eyes that move and blink on a rectangle screen. The robot engages residents through voice-based interaction, facial recognition, and memory functions. While the robot has been deployed in assisted living facilities in Australia, this study represents its first introduction to a memory care setting and to the United States. The memory functions were deactivated during the initial phase to reduce potential confusion for residents with dementia.

The robot was introduced by the long-term care community as part of its broader organizational innovation efforts. The research team did not direct or control the implementation process, rollout schedule, staff training, or operational use of the robot. Rather the study was designed to observe and evaluate staff experiences during a real-world implementation within an established care environment.

Sandelowski's (2000) qualitative descriptive design methods were used to examine staff perspectives on integrating the humanoid robot within a memory support neighborhood. This

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approach provided a pragmatic summary of staff experiences in a real-world care setting.

Research took place in a secure memory support neighborhood within a long-term residential care community serving up to 25 residents with ADRD. A convenience sample of 15 direct and indirect care staff was recruited. All staff in the neighborhood were invited to participate, with those involved in resident-robot interactions being eligible. An interdisciplinary team (n=6), with expertise in nursing, social science, and community-based care, undertook data collection and analysis. Reflexivity was addressed through regular discussions of reflective memos to consider how disciplinary perspectives and prior experiences might influence data interpretation.

Ethical approval was granted through an exemption determination by the University of California Davis Institutional Review Board (IRB # 2413699-1). Informed consent was obtained from participants or their legal representatives, and confidentiality was maintained through de-identification and secure data storage.

Data Collection

Data collection included a pre-implementation focus group and staff interviews during the first eight weeks following the robot's introduction, capturing initial expectations and experiences. All 15 participating staff members took part in the pre-implementation focus group, which provided a broad range of perspectives across professional roles. To supplement these data, three individual interviews were conducted during weeks sixth and seven with staff members who had first-hand knowledge of frontline operations and direct experience using the robot during the initial implementation period. These interviews were conducted intentionally to obtain in-depth insights into early implementation experiences from those directly involved in the robot's day-to-day operation and use, rather than to achieve broad representation across all staff. Interview topics included perceived benefits, barriers, resident responses, workflow considerations, and recommendations. The selected participants were uniquely positioned to comment on operational experiences during the implementation phase. This research brief reports preliminary findings from a larger ongoing study and intended to provide an initial

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understanding of implementation experiences rather than a comprehensive evaluation. All sessions were audio-recorded and transcribed verbatim using automated software, then manually cleaned and de-identified. The primary investigator reviewed the transcripts for accuracy and prepared them for analysis.

Analysis

Data analysis used an iterative qualitative descriptive approach (Miles et al., 2014; Sandelowski, 2000). The research team reviewed transcripts independently and collectively to identify recurring concepts, patterns, and themes. The process emphasized fidelity to participants' accounts while organizing data into thematic categories. Six research team members coded the transcripts independently and presented findings in four iterative qualitative coding cycles, facilitating the synthesis of repeated concepts and emerging patterns. Through these cycles, codes were reviewed, compared, refined, consolidated into thematic categories, incorporating both common themes and distinct perspectives.

Preliminary themes were refined through team discussions and comparisons across data sources to enhance credibility, consistency and transparency. Trustworthiness was supported through analyst triangulation, with multiple researchers independently coding the data and reading consensus through discussion. An audit trail documenting coding decisions and theme development was maintained throughout the analysis. Thematic saturation was determined when no new codes, concepts, or themes emerged during successive coding cycles and team reviews. The research team reached consensus that the final themes adequately captured participants' experiences and perspectives.

Results

Results are reported in alignment with the Standards for Reporting Qualitative Research (SRQR) guidelines. All eligible staff volunteered to participate (N=15). Participants represented

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diverse caregiving and indirect care roles within the memory support neighborhood, including life enrichment coordinators, medication technicians, nursing assistants, food services staff, and administrative leaders, with varying levels of memory care experience. Analysis of one pre-implementation focus group, and three individual staff interviews yielded three overarching themes: Dynamics of Implementation Sense-Making; Ambivalent Imaginaries of the Robot; and Situated Interaction Work and Operational Burden (Table 1). These themes reflected perceptions of the robot's acceptability and usefulness, resident engagement, implementation barriers, workflow impact, and recommendations for robot integration. Minor recurring concepts were subsumed within the major themes; some were cross-cutting. No themes were discarded.

Themes

Dynamics of Implementation Sense-Making: Framing the Robot Through Experience, Role, and Exposure

Staff demonstrated differential readiness for robot integration, reflecting active sense-making shaped by personal history, role-based exposure, and evolving experiences. Prior exposure – through independent research, familiarity with service robots, or popular culture's multi-media portrayals (such as robot movies) influenced expectations. Some sought informational videos before the robot's introduction, while others expressed concerns about job displacement. Prior exposure shaped staff expectations. A few reported having experience with utility robots in food service areas within the same community. In contrast, others had minimal prior knowledge, contributing to uncertainty in their initial impressions.

Preparation for the robot's implementation varied across roles. Participants reported limited training on the robot, affecting perceived readiness. Initial reactions ranged from skepticism to curiosity and cautious optimism, particularly regarding the suitability of robotic technologies in memory care. Some expressed excitement about the innovation and its potential

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benefits. Role and timing further shaped staff readiness to integrate the robot into programming.

Life enrichment staff were expected to incorporate the robot into activity sessions, but their readiness depended on when they were scheduled to involve the robot, affecting their ability to integrate it into both group and individual activities. Other staff were more peripherally involved. Because the robot was introduced by the long-term care community as part of its broader innovation strategy, leadership played an important role in communicating its purpose, setting expectations, and supporting staff engagement throughout implementation.

Readiness evolved with exposure. As staff observed resident responses - particularly the engagement of difficult-to-reach residents – some began to soften their initial skepticism. This exposure also revealed limitations, such as repetitive interaction activities and content. Overall, readiness emerged as a dynamic concept, developing through ongoing interactions, reflections, and lived experiences with the robot.

Ambivalent Imaginaries of the Robot: Between Promise, Personhood, and Limitation

Staff members expressed ambivalent perceptions about the robot, recognizing its potential for engagement and its functional and relational limitations. Various subthemes reflected possibilities and constraints. The robot was viewed as a promising social tool but also as a constrained technological system. Staff described meaningful interactions, particularly through music, movement, and amusement (i.e., emitting bubbles). Often, withdrawn residents displayed increased attention (evidenced by opened eyes), emotional responsiveness (smiling), and participation (moving to the music or mouthing lyrics). Others noted that the robot engaged residents less responsive to other activities, with effects sometimes lasting beyond the interaction session, fostering optimism about its role in care.

However, this prospect coexisted with recognized limitations in communication and personalization. The robot was described as ‘human-like’ but was perceived as distinctly non-

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human, lacking key relational features and simulated empathy (e.g., “The robot doesn’t smile ... she only has eyes”). Expectations of advanced AI shaped perceptions, with some staff anticipating expansive knowledge and adaptability, only to find repetitive dialogue and limited conversational depth.

Staff also noted unmet potential regarding memory and personalization, expressing a desire for the robot to recognize residents and recall their histories, which influenced their evaluations in the early weeks of integration. These limitations tempered initial enthusiasm and reinforced perceptions of the robot as underdeveloped.

Staff frequently referred to the robot using human-like terms (i.e., ‘she’), reflecting anthropomorphism and a desire for connection, while acknowledging its lack of emotional depth compared to human interaction. Thus, the robot was perceived as “more than a tool’ but ‘less than a person,’ existing in an ambiguous space. These findings reflect the ongoing tension between promises and limitations.

Situated Interaction Work: Relational Mediation and Operational Burden

Staff described that integrating the robot required substantial interactional and operational effort, highlighting the need for active mediation to sustain resident engagement. While robot-facilitated sessions, featuring music and bubbles, were often described as enjoyable, their success heavily relied on the quality of staff interactions with residents. Staff served as facilitators by prompting residents, initiating and sustaining interaction, and intervening when the robot struggled to maintain engagement. One staff member described intervening to encourage resident responsiveness during a group activity. Communication challenges such as conversational stalls, delays, and the robot not observing conversational turn-taking disrupted interaction flow and caused confusion.

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Operational and technical barriers also affected staff experiences. Issues like response latency and battery problems led to frustration and reduced confidence in the robot's reliability. Some staff perceived the robot as redundant, believing they could perform similar engagement activities more efficiently without technology. However, not all staff perspectives were negative. Most recognized the robot's potential value if consistently integrated into care. One participant expressed a desire for ongoing use rather than abandonment. Each interviewee shared stories of residents positively influenced by robot interactions. For instance, one resident, who had not walked outside in weeks, was seen walking with staff support after spending time with the robot, motivated to "see what else is offered" in the community.

This theme underscores that the robot's effectiveness depends not only on the technology itself but also on staff effort, adaptation, and willingness to incorporate the robot into care practices.

Discussion

This study examined staff experiences during the early integration of a humanoid companion robot in a residential dementia care setting. Staff described the robot as a promising technology that facilitated meaningful engagement with residents, particularly through music and play – but noted its effectiveness was context-dependent. Staff emphasized that the robot's utility relied on factors such as staff readiness, resident responsiveness, technical reliability, human facilitation, and alignment with person-centered care practices. Staff readiness emerged as a key factor in successful integration, with varying levels of preparation shaped by prior exposure, professional roles, and access to information. Some staff proactively sought information and had familiarity with robotics, while others reported uncertainty about expectations and concerns over job replacement.

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Clear communication regarding the robot's purpose, capabilities, and staff roles is essential (Pino et al., 2026; Ren et al., 2024). Structured onboarding and training can alleviate uncertainty and frame robots as complementary tools rather than substitutes for human care (Franke et al., 2021; Leoste et al., 2025). Consistent with prior research, staff acceptance appears connected to perceived usefulness, workload impact, ethical considerations, and compatibility with care routines (Lee et al., 2025; Rigaud et al., 2024; Wong et al., 2024).

Staff perceptions evolved during the first eight weeks of implementation, reflecting an ongoing process rather than a one-time event. Initial skepticism lessened as staff observed increased resident engagement, particularly among those difficult to involve. However, early enthusiasm was tempered by challenges such as repetitive content, communication delays, and technical issues. This highlights the need for an iterative approach to robot integration, where continuous feedback from staff can identify areas for improvement and ensure alignment with care workflows over time.

Staff identified key areas where the robot enhanced resident engagement. Interactions involving music, movement, play elicited attention, participation, smiles, and emotional responses, even from residents who are typically less engaged. These observations align with literature highlighting the role of socially assistive robots in supporting companionship and psychosocial well-being in individuals with dementia (Khosla et al., 2021; Kim et al., 2025).

However, staff noted significant limitations related to personalization (memory), communication quality (delayed responses and repetitive conversations), and expressive capacity (facial expressions). During this early study phase, the robot's memory and personalization features were intentionally deactivated to prevent distress or confusion among residents with dementia. While this decision prioritized safety considerations, it constrained the robot's ability to provide individualized, relationship-based interactions. Person-centered

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dementia care depends on understanding residents' histories, respecting their preferences, and tailoring interactions to their abilities (Fazio et al., 2018; Van Haitsma et al., 2020). These limitations significantly influenced staff evaluations of the robot's effectiveness.

The findings highlight the central role of staff in mediating human-robot interaction. Staff served as mediators and troubleshooters, particularly during communication breakdowns or technical issues, suggesting the robot functioned more as a co-facilitated tool rather than an independent agent. While some staff perceived this as an extra burden, others recognized potential benefits when the robot was used in suitable contexts.

Future robot designs should prioritize reliability, responsiveness, and personalization. Preparatory training should provide guidance to support staff in facilitating interactions. Gerontological nursing practice is vital in evaluating, adapting, and ethically integrating such technologies into care. Staff emphasized that robots should not replace human interaction but serve as adjuncts to person-centered care. Their value depends on thoughtful integration, clinical judgment, and alignment with residents' needs and preferences, reinforcing the importance of relational care while exploring how technology can enhance human connections.

Limitations and Future Research

This study has several limitations. The sample was drawn from a single residential memory care neighborhood, potentially restricting the transferability of the findings. Although all 15 eligible staff participated in the pre-implementation focus group, only three completed follow-up interviews, potentially limiting the range of implementation perspectives captured. Data were collected during the early implementation phase, and staff perceptions may evolve with increased exposure to the robot. Additionally, the robot's memory and personalization features were not fully used, which may have influenced staff views on its usefulness.

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Future research should examine changes in staff and resident experiences over time as the robot's functionality improves and integration stabilizes. Longitudinal studies incorporating follow-up interviews or focus groups would provide insight into evolving perceptions and adoption processes. Investigating how personalization, memory features, and adaptive communication influence engagement in individuals with dementia is needed. Research should also focus on optimizing workflow integration, staff training, and ethical guardrails for sustainable use. Broadening research across diverse settings and populations will be essential for informing best practices and guiding the responsible adoption of humanoid companion robots in memory care environments.

Conclusion

The integration of humanoid companion robots in memory care depends on staff readiness, perceptions of their benefits and limitations, and the interactional work required for effective use. These findings highlight that while these robots can enhance engagement when thoughtfully integrated, their success depends on technological refinement, staff involvement, and adherence to person-centered care principles.

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Table 1. Major themes, subthemes, and exemplar quotations from one staff focus group and three interviews. Cross-cutting concepts supported more than one theme and are identified under subthemes.

Themes	Subthemes	Exemplar Quotation	Participant ID	Brief Context
Dynamics of Implementation Sense-Making	Personal History: Prior Exposure	"I just started looking at videos online to see what it does."	P4	Independently researched Robot before it arrived.
	Personal History: Popular Media	"Terminator"; "Are you gonna take my job away?"	Focus Group	Media, job fear shaped expectations.
	Knowledge of Rollout / Role	"I didn't realize what exactly was happening."	P1	Advance notice and preparation varied by role.
	Initial Reaction	"When it first came ... [I was] a little skeptical, given that this is memory care."	P4	Skepticism rooted in resident cognitive acuity.
	Exposure Over Time (cross-cutting)	<u>Negative</u> : "I feel like it is kind of getting worse ... it's a repetition of the same questions." <u>Positive</u> : "I think how we [can] use her ... I think it could be a really cool thing."	P1	Appraisal shifted across the eight weeks.
Ambivalent Imaginaries of the Robot	Possibility: Power of Music	"They literally opened their eyes and started moving their arms and was mouthing the words to the song."	P5	A withdrawn resident reached through a familiar song.
	Possibility: Reaching the Unreachable (cross-cutting)	"There were some residents who were engaging with Robot ... the ones that have trouble engaging in other activities."	P1	Robot engaged residents while other activities did not.
	Lasting Impact	"After Robot leaves, he talks about her ... that means there's a lasting impact."	P5	Effects appeared to persist beyond the session.
	Recognizably Other: Form	"She doesn't necessarily look human, but she's humanish."	P5	Acceptance of a recognizably non-human form.
	Recognizably Other: No	"Robot doesn't smile ... she only has eyes," while a staff	P1	Absence of human expression

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Themes	Subthemes	Exemplar Quotation	Participant ID	Brief Context
Situated Interaction Work and Operational Burden	Smile	smile “means the world.”		was noticed.
	Expectation vs. Reality	“I heard the word AI ... [I thought] it should have ... expansive knowledge ... but it’s the same four things.”	P1	AI expectations exceeded the Robot’s capability.
	Unmet Potential: Memory	“I really want her to remember residents and to remember their lived histories.”	P5	Hope tied to future memory, personalization features.
	Fun Engagement	“When everybody started playing the music and doing the bubbles ... that was really fun.”	P4	Music and play drew smiles and movement.
	Mediation Operator	“That’s when I jumped in ... let’s wake up ... and then they responded.”	P4	Staff facilitation drove resident engagement.
	Communication: Stalling	“She can’t finish a full conversation without asking, do you want to hear a joke or ... music.”	P1	Stalling disrupted conversational flow.
	Communication: Delay	“Robot has a delay, which ... creates this, like, what’s going on?”	P5	Latency confused residents during interactions.
	Burden Redundancy (cross-cutting)	“Everything that Robot does, I can do without the buffering ... I believe I can do that better.”	P1	Robot perceived as redundant and adding burden.
	Technical Issues	“The little low battery ... what the heck is going on with that? ... maybe for a month now.”	P1	Persistent technical problems eroded confidence.
	Variant Perspective: Partnership and Hope	“I don’t want to see her winding up in a closet ... I want to see her out ... every day being able to connect with residents.”	P5	Counter-voice resisting dismissal of the robot.

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