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# Effect of design interventions on a dementia care setting

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## Abstract

*This study examined the effects of particular design interventions in a long-term care facility on residents with dementia and staff perceptions of care delivery. Major renovations were carried out in a care facility in the Midwestern United States. Renovations included a new addition of a dementia care unit designed as a cluster of resident rooms around living and dining areas, and two renovated wings with decentralized dining areas. The research methods used in the study included environmental assessment with the Professional Environmental Assessment Protocol (PEAP), behavioral mapping, and focus-group interviews with staff members. The renovated environment scored higher in PEAP and was perceived by the staff members as a more homelike setting. Although behavioral observations indicate that there was more involvement in programmed activities by the residents, the decentralized neighborhood design did not meet all the behavioral expectations due to a lack of appropriate activities, high staff turnover, and family members' resistance to the relocation of their loved ones. Organizational commitment, advanced planning for appropriate staffing levels, and dementia-related training is crucial for fuller realization of the potential of a household design.*

*Key words: nursing home, long-term care, Alzheimer's disease, dementia, environment, Alzheimer's activity programming*

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## Introduction

Researchers and providers believe that many of the negative behaviors commonly associated with dementia are reactions to inadequate care and treatment in inappropriate environments rather than symptoms integral to the disease.<sup>1,2</sup> Many of the behaviors attributed to people with dementia are, in part, a consequence of institutional long-term care environments.<sup>3-5</sup> There is a growing recognition among many scholars that the physical environment and social care milieu can enhance or diminish the quality of life for people with dementia. Favorable outcomes of intervention in dementia care have been identified in four major areas: 1) functional competence, 2) behavioral symptoms, 3) positive behaviors, and 4) subjective quality of life.<sup>6</sup>

This study assessed the influence of design interventions on an existing long-term care facility for residents with dementia and the staff members. The study was conducted at a facility located on the campus of a continuing care retirement community in the Midwest. The purpose of the renovations and additions to the facility were to create a more responsive physical, therapeutic, and homey environment for physically and cognitively impaired elderly.

The renovated setting was designed to decentralize dining and bathing facilities for smaller groups of residents, creating a residential environment. Renovations included replacing the architecturally dominant central nurses' station with an aviary, introducing a smaller nurses' station, decentralizing dining areas for smaller groups of residents, and improving interior design by adding appropriate lighting and carpeting to improve the ambiance and make it less institutional.

Additions to the existing building included two dementia care units on two floors, designed as a cluster of 12 resident rooms surrounding a common living room. The single large dining space in the existing facility was replaced with three smaller separate dining and kitchen areas for the use of



**Figure 1.** Prerenovation double-occupancy residents' room.



**Figure 2.** Postrenovation single-occupancy resident's room.



**Figure 3.** Postrenovation aviary.

10-12 residents on each floor. In contrast to the double-occupancy rooms before renovation (Figure 1), most rooms in the new addition were designed for single occupancy (Figure 2).

Each room included a private bathroom, large storage space, and ample room to encourage family visits. The prerenovation centrally located large nurses' station with corridors on all four sides was a strong contributing factor to the institutional character of the setting. The new nurses' stations were decentralized and reduced in scale. Smaller nurses' work areas were built on each floor to serve each neighborhood. An aviary (Figure 3) replaced the prerenovation central nurses' station on each floor to reduce the institutional ambiance and to introduce nature into the interior environment.

These arrangements, coupled with other residential accommodations, and remodeling of the existing nursing home promised to contrast the medical orientation of the care facility with a more residential environment. The design interventions in the physical environment were to be followed by new care policies and programs.

## Methods

The study maintained that the complex connections between the physical environment of the nursing home and its residents, visitors, and staff members merited an interdisciplinary investigation and collaboration among scholars. Accordingly, the study organized an interdisciplinary team comprised of researchers from the Environmental Design Department, Human Development and Family Studies, and the School of Nursing at the University of Missouri at Columbia.<sup>7</sup> The research was designed to employ a pretest, post-test design for data collection and a combination of quantitative and qualitative methods. These various methods were applied at both the individual and aggregate levels of analyses.

### *Professional Environmental Assessment Protocol*

The Professional Environmental Assessment Protocol

(PEAP)<sup>8</sup> was used to conduct focused evaluation of the facility before and after environmental modifications. This instrument is based on eight attributes of environmental experience: 1) awareness and orientation, 2) safety and security, 3) privacy, 4) regulation and quality of stimulation, 5) functional abilities, 6) opportunities for personal control, 7) continuity of self, and 8) facilitation of social contact. The primary advantage of the PEAP instrument is its documentation of both discrete and global aspects of the environment that support the eight attributes of the environmental experience. Scores in the eight categories served as a baseline assessment of the environment before and after renovation at the facility. Four members of the research team used PEAP to assess the facility, ensuring data reliability.

### *Behavioral mapping*

Fundamental questions of this research included: 1) How were the nurses' station, activity room, dining room, kitchen, and hallways utilized?; and 2) Who were these users? The behavioral mapping study, which involved direct, systematic observations of spaces, was the primary method to gather data to answer these questions. Place-centered behavioral mapping<sup>9</sup> was used for observation of activity patterns of residents, staff members, and visitors in different public spaces. Observational instruments consisted of floor plans of the two levels of the facility and a checklist of possible types of activities. The checklist was based upon previous behavioral mapping that was conducted in other dementia care facilities.<sup>10</sup>

Data were gathered in randomly assigned half-hour periods from 9:00 AM to 6:00 PM on various days of the week including weekends. The procedure involved documenting the user group (residents, staff members, and visitors), number of users, and activity pattern in a given space for a particular period of time. Residents, staff members, and family members' identities were not documented. Therefore, data evolved in terms of aggregate numbers of residents, staff members, or visitors without reference to the specific identity of the individuals. The behavioral mapping was conducted

in three phases: 1) prior to the environmental modifications, 2) immediately after relocation in the renovated setting, and 3) three months after the relocation.

Observations were conducted in the shared or common spaces (i.e., dining and activity space, lounge areas, and hallways). Private areas, such as residents' rooms and bathrooms, were excluded for privacy reasons. Frequency counts were calculated for the number of residents or staff members using the different spaces, as well as the types of their behavior. To insure the inter-reliability of the observation, two researchers completed the same data-gathering methods for two hours in each observation session and compared their results.

### *Focus group with staff members*

Focus-group interviews are used extensively in qualitative research methods. Advantages of focus-group interviews include efficient, qualitative data collection, checks and balances on differing opinions, and opportunities to explore emergent issues in an interactive process.<sup>11</sup> Two focus-group interviews were conducted with facility staff members to gather information regarding aspects of the physical environment of the renovated areas. The first interview was conducted after the completion of the construction of the new wing on the north side of the building. The second interview was conducted six months after the relocation. A slide show presentation during the interviews highlighted before and after pictures to elicit responses from the focus group regarding specific environmental aspects of the nursing home. Staff members were encouraged to comment on salient quality of life issues for the residents (e.g., privacy, social interaction), as well as caregiving issues (e.g., ease or difficulty in showering a resident).

## Results and discussion

### *Professional Environmental Assessment Protocol*

The newly built cluster arrangement scored higher in all eight areas of the PEAP instrument compared with the scores of the facility before renovation. The three areas of: 1) maximize awareness and orientation, 2) provision of privacy, and 3) facilitation of social contact had the highest variation in the pre- and postrenovation PEAP scores. The score was higher in the "privacy" dimension as a majority of the residents' rooms in the new cluster were single-occupancy, whereas the majority of the residents' rooms in the prerenovation facility were double-occupancy. The higher score in "facilitation of social contact" can be attributed to the cluster floor-plan layout that allows direct visual and physical access to the activity area from the residents' rooms. This centrality of the living area and adjacency to the dining area

also affected the two-point variation in the PEAP dimension of "maximize awareness and orientation." Residents' rooms surround the new common living and activity space in each cluster. This arrangement increases the potential of utilization of the activity area and lounge by the residents compared with the location of the single activity space before the renovation, which was located relatively remotely from the residents' rooms.

### *Behavioral mapping*

The most utilized spaces in the facility before the renovation were the main activity lounge on the first floor and the hallway spaces around the nurses' stations on both first and second floors. Prerenovation behavioral mapping indicated that activities in the main lounge on the first floor had, on average, 20-30 participants. Most of the programmed activities for the residents were held in the first floor activity space. This posed a formidable challenge of access for some residents on the second floor, who had to take the elevator and find their way to the activity space on the first floor. While a few residents on the second floor sought assistance from the staff to get to the activity room, most of the residents on that floor spent time sitting in front of the nurses' station. Postrenovation behavioral mapping data indicated that residents on the second floor were spending time in the newly constructed or renovated living and activity areas adjacent to their rooms during the scheduled activities in the main activity room on the first floor. This option of easily accessible living areas in clusters allowed them to choose between staying in their own households and going down to the main activity space. However, although residents on the second floor could informally interact with fellow residents in a smaller, residential-scale living area, they could not benefit from participating in programmed activities because they were not offered in the household activity spaces.

The three dining rooms on each floor that were created during the renovation were smaller in size and less institutional in ambiance, compared to the single, large dining space that served the facility before the renovation. The new dining spaces served eight to 10 residents compared with the 25 to 30 residents who had their meals in the large dining area before the renovation. Behavioral mapping data indicated that there were fewer incidents of disruptive and agitated behaviors in the new dining areas than in the larger dining space that served the residents prior to the renovation. Staff members seemed to be having more sustained conversations with the residents in the new dining spaces than they were having in the old dining space. The reduction of group size in the new dining areas reduced the possibility of the chain reaction of disruptive behaviors during mealtimes.

## Focus group interviews

Themes that arose from the focus groups with the nursing and activity staff members based on their evaluation of the various spaces were as follows:

**Nurses' work area.** Before the renovation, the nurses' station was located at the intersection of major circulation routes in the nursing home. The central location of the nurse station and its presence was a powerful physical and social symbol of the institutional model. After the renovation, the nurses' station was reduced in scale and relocated to one side of the central intersection of the hallways. Staff members thought that the relocation had improved the staff-resident interaction, had made the work more organized due to the improved circulation in that area, and had given easier access to the medication room. Some staff members commented that the reduced visual access to the hallways from the new nurses' area was not a drawback as long as there were other monitoring devices.

**Aviary area.** The central nurses' station on both floors were replaced by aviaries. The general reaction from the staff was that replacing the prominent nurses' station with the aviary reduced the institutional ambiance in the facility. However, some staff members were concerned that residents sitting near the aviary were engaged in passive behavior. They suggested that there was a need for more programmed or structured activities in association with the aviary in order to improve residents' social engagement. This latter aspect identifies one of the gaps between environmental modifications and expected corresponding activities for residents with dementia.

**Residents' rooms.** In general, staff members were positive about the residents' rooms and their residential appeal. Specifically, they felt that the carpeting in the rooms had created a homelike atmosphere. The staff felt very positively about the privacy provided to both residents in the L-shaped shared rooms. They had observed that families were using the rooms more freely during their visits with the increased sense of privacy. Also, they appreciated the option of showering in the private bathrooms. There were positive comments about the bay windows that provided opportunities for displaying meaningful personal possessions like photographs, dolls, vases, and various artifacts. The residents were able to personalize their spaces, which can help them to maintain a sense of control and autonomy in their rooms.

**New household.** The new cluster arrangement was designed to enhance the residential and social model of care. Staff members observed that the central living and activity area in that household with the surrounding residents' rooms provided opportunities for natural social interaction between the staff members and residents. The staff members commented that the cluster design was an improvement over the old part of the nursing home, which was characterized by

long hallways and was not conducive for informal social interaction. During the time when the focus group interviews were conducted, the facility was in the process of reorganization in staffing patterns. The goal was to educate staff members about the new environmental layout in order for them to take advantage of the decentralized activity and dining areas and to provide training in order to offer small group activities at the household level.

## Conclusion

The main goal of this study was to determine whether design interventions effect desirable behavioral outcomes in nursing home residents with dementia. Due to the nature of the subject matter, the characteristics of the setting were intertwined with issues of organizational policies, lack of special programs, problems with balancing staff workload, and the overall reality of declining acuity levels of the residents through the progression of the diseases. Clearly, the new residential setting with its homey attributes helped to change the patterns of space usage by the residents. Evidence of the changes was documented in the findings of the behavioral mapping and the PEAP. Other indications for the change in resident interaction with the environment were found in responses from the staff focus group. In most cases, the changes had been positive and seemed to justify the investment in the modification of the environment. The study raised two general issues essential for realizing the potential of an environmental renovation.

First, organizational commitment to restructuring of staffing patterns and resident-centered care programming is critical. Investment in the physical design of a dementia-care setting is an essential component towards raising the quality of life for residents. However, appropriate staffing issues were overlooked to take advantage of a residential care environment. Resident-centered care planning based on a residential care philosophy would warrant changes in staffing models and training as a departure from practices based on medical models of care. This study is indicative of the shift in focus from an organizational standpoint in reconsidering staff training options, decentralized activity programming, and careful planning to take full advantage of any physical renovation.

Second, a participatory planning process that involves staff member input at various levels of project development is important for reducing relocation-related difficulties for the residents and staff members. To ensure development of a residential care setting in which the physical design would fit the daily activity pattern in a coordinated way, input from front-line staff members (e.g., nurses, activity staff members) at different levels of design development reduces the effects of unnecessary pitfalls and allows the incorporation of design solutions based on day-to-day experiences. Also, a

participatory process can help create a sense of ownership and pride among the staff about the project.

The lack of adequately trained staff that could offer responsive programs for residents with dementia and high staff turnover was critical in contributing to the facility's shortcomings toward better utilization of the decentralized model. This study reaffirms our understanding of the integral nature of the physical environment with the organizational commitment and policies of a dementia care facility. Any modification in the architectural environment needs to be orchestrated with appropriate organizational, staff, and social changes to achieve the full potential of a physical design based on homelike characteristics.

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