Dementia Environment Design in Seniors Housing: Optimizing Resident Perception and Cognition

Steven J. Orfield

ABSTRACT

Aging and dementia-related decline are known to be separate processes. While the design research community has begun to learn the quantitative dimensions of sensory decline in aging and some relevant design processes, many experts do not separate aging and dementia clearly in discussions of the differences in perceptual/cognitive aging and design for dementia. This article focuses on research-based design (RBD) for dementia and on aging as an underlying sensory issue. Seven years ago, Orfield Labs instituted a research program in aging perception and performance that has developed quantitative, measurable building performance standards for seniors housing design. RBD for dementia requires consideration of issues of cognitive decline common in dementia. This commentary looks more specifically at dementia and design of environments, as dementia is the most complex elder design focus, and user information is far more difficult to gather. With the care component of these environments being the primary concern, design that optimizes resident perception and cognition has suffered.
INTRODUCTION

This article is based on the practice and science of research-based design (RBD) and aging. The basis of RBD has been covered in a previous article (Orfield, 2013). This work follows up on seven years of study in aging perception, 16 years of founding and administering national RBD collaborations, and hosting 31 national design research conferences (Orfield, 2008, 2010). The approach to aging and dementia is similar to the RBD consulting we have done for the past 40-plus years in all commercial building types, from corporate, industrial, health care, and education, to performing arts, preservation, multihousing, and other building types (Orfield, 2006). Our efforts to better understand aging perception have included (Orfield, 2013):

- in-depth discussions with major national not-for-profits and their associated experts
- review of medical and psychological research on perception and aging, as well as personal discussions reviewing research with many top aging researchers
- review of the field in collaboration with academic programs associated with aging, on referral from the aging not-for-profits and researchers
- conversion of research into architectural engineering metrics that can be directly applied to the normal design process in renovations or new buildings

Each building type project represents a definable demographic of user, and definitions must be aimed at that user group. Each building type informs the others, and that design for non-disabled populations informs design for those with disabilities (Orfield, 2013). Most buildings for non-disabled users are measureable as perceptually uncomfortable and are designed with no user experience research. Our work in aging and dementia is a result of coming from a scientific and measurement tradition and background, which in many ways is more similar to that of Europe or Australia (Black, 2012). We have spent the past three decades defining, modeling, and measuring environments based on quantitative definitions of perceptual comfort and based on visual design research on perceptual preference.

Our data on aging (at 90 years old) and data on dementia that have been researched in this process have been useful in identifying the most relevant issues for these two demographics in framing our initial research efforts in disability-based perceptual and cognitive design. Our research has also focused on persons living with autism and sensory processing disorder, who, in many ways, have great parallels to persons with dementia (Hallowell & Ratey, 1994; Bogdashina, 2003; Cain, 2012; Orfield Laboratories, 2013; Harvey, 2014; Miller & Fuller, 2014). Much of our work has considered the commonly accepted background view that dementia, much like autism, is a condition that requires control of behaviors that are often an outcome of the diagnosis.

In contrast to the diagnostic behavioral focus, our consulting emphasis has been less on controlling our users’ behavior and more on understanding their user experience and enhancing their lives, based on an understanding of user experience and needs (Orfield Laboratories, 2012). Additionally, we have long believed that aging and dementia diagnoses are not adequate descriptions of the populations in mind. It is essential to consider the individuality, variability, and complexity along both continuums. Older adults and those living with dementia are first of all normal people with distinct personalities, preferences, experiences, cultural backgrounds, and generational backgrounds. Thus, we characterize aging and dementia as perceptual and cognitive “filters” affecting otherwise normal persons, and our response to these filters is significantly better design that mutes the impact of these filters to ensure a more connected and satisfying life experience (Orfield Laboratories, 2012).

Much of what we need to know about these populations relates to their individual humanity, and the more we look at mid- and late-stage dementia, the more this is fundamentally important. Each person within a given classification and level of dementia becomes more sensitive in various ways to the features of her/his physical environment. The Progressively Lowered Stress Threshold Model (PLST) has demonstrated this (Smith, Gerdner, Hall, & Buckwalter, 2004).
Aging and Dementia

Our first article covered these topics and is the basis for the additions related to dementia in the current article (Orfield, 2013):

- RBD
- Architectural Research Consortium (ARC)
- ARC process and results
- American Institute of Architects (AIA) and expert intuition
- perceptual research on aging
- architectural education
- communications on aging design between architects and clients
- experimental immersion as an educational tool
- case studies

In normal aging, we recognize a series of age-related declines in perceptual, cognitive, and physical performance, many of which are quite well known in research on aging perception and cognition (U.S. Census Bureau, 2010). Much of our information comes from single discipline researchers who work in one field, such as vision. Few researchers work across the multiple areas of human perception. Thus, there is little aggregation of this information in any one expert resource. Similarly, in the design field, a different design consultant may deal with each sensory modality or there may be no perceptual design consultants at all (e.g., acoustics, audio/visual, lighting, daylighting, thermal comfort, indoor air quality). These consultants generally know a limited amount about the engineering side of their field, such as acoustics, but little about the knowledge of the perceptual side. Consultants in building performance (e.g., acoustics, lighting, thermal comfort, indoor air quality) are generally not familiar with the numerous variables that impact design and performance when dealing with aging and dementia. Similarly, their professional societies often have limited knowledge of the relationship between their field and disabled populations, since this is a newer and complex area of design research.

The magnitude and perceptual impact of each of these declines is not well known in the design community. These data for dementia in particular are even less well known within the design community. We know that perceptual and cognitive performance is reduced in normal aging, but we often do not consider that dementia reduces the cognitive ability, the quality of memory, and the very logic of thought. The executive functions reduce substantially as dementia progresses. In contrast to the perceptual and cognitive reductions in normal aging, which are substantial later in life, dementia overlays on this unclear world a large additional burden on the older adult. While aging declines reduce the sensory and cognitive information perceived within the environment, dementia-based declines reduce the ability to accurately identify and interpret that information at the speed and with the quality needed to process it (Zeisel et al., 2003; European Innovation Partnership, 2012; Harvey, 2014).

While there are many publications in design and aging that point out perceptual deficits and general solutions, there is a need to understand the particular relationship between the deficits and specific aspects of environmental design. The objective is twofold: first, one must ascertain how to optimally apply this information to the design, and second, one must verify whether the intended efforts have been successful to the user group. Shared, measureable definitions help to standardize research efforts. There must be a consideration of outcomes and a focus on maximizing variables that are likely to yield the most significant impact in terms of quality of life and functionality of the user group (Chapman & Rosenfeld, 2011).

Will a specific design intent, such as intending to reduce glare or intending to reduce noise, actually be significantly beneficial to aging residents? Do designers mean the same thing by glare or noise? What level of solution is a minimum step toward benefit, and what level of solution is a major step? In the range of benefits, what is the cost-benefit analysis of these changes? And most important, is one's experience as a designer a guideline to the experience of elders? Can a designer use his/her architectural and design intuition to resolve problems that have never been experienced via intuitive methods that have seldom been validated to work well in normal design, much less in disability-
based design? This is where outcomes research, based on measurements of the actual behavior and experience of the user group, is essential. The design field constantly faces these questions, and designers’ responses generally represent a qualitative attempt to understand and resolve problems since they tend to have few research tools at their disposal to measure the potential benefit of their solutions pre-implementation, and typically, they have no measurement systems to measure the solutions after implementation. They have the difficulty of being unable to share the intuitive experience of aging and dementia (Martin, 2012).

When we match the understanding of aging with the understanding of dementia (including Alzheimer’s disease), we have another set of declines that are not age related, but rather they are declines in cognitive performance and executive functions. These include memory loss, impaired judgment, disorientation, sleep disturbances, and difficulty with language. As we talk with dementia care professionals, we see that age-related declines and dementia-based declines are separated into two different conditions, but when investigating the care models and the environmental design model for each category, we begin to see that they are often no longer separated as clearly in describing dementia-related design. In many cases, persons living with dementia are put in secure environments, but the perceptual and cognitive clarity they need is lacking (Caspi, 2014, 2015).

Dementia care and design need to consider age-related declines as a baseline, but often they do not identify age-based declines as separate from dementia-related declines. An approach to design strategies in aging and dementia may be framed as follows:

• Most of the older population will benefit from more perceptual clarity, less perceptual noise, and more easily understood human factors and user-experience based design.
• Persons living with dementia will benefit more from these same strategies, as their condition reduces perceptual clarity in addition to adding other deficits.
• Long-term care residents will further benefit from strategies that focus on the declines that are typical of the dementia diagnosis but are not typical of normal declines in aging. These include declines in judgment, memory, logic, and clarity. We need a strategy for typical decline in aging and an additional one for dementia-based declines. (This is not to say that age-based declines are universal, as there is clear variability, but age-based decline is the norm.) Designing for dementia will thus be suitable for aging populations without dementia, as most populations prefer environments that are clearer and more logical (Orfield, 2013).

This conceptual framework has the benefit of reducing the problems of age-related losses by focusing on the entire population with regard to perceptual performance and declines, both in terms of making environments clearer and in diagnosing and treating declines that are manageable, such as visual and aural losses that are in need of treatment or correction (Berard & Brockett, 2011). It also has the benefit of bridging into dementia by ensuring that environments already have a certain baseline perceptual clarity so that age-related declines are dealt with effectively and dementia-based losses are not so highly compounded by environments that do not deal with excess disability losses. Thus, the schema of our approach to this compound problem is:

• increase perceptual clarity and reduce perceptual noise for better aging perception
• increase perceptual clarity via reduction of visual and auditory complexity so that the environment requires less cognitive perceptual processing by the older adult
• increase the metaphorical logic of the design so that the older adult is less dependent on memory in navigating the environment—this is done by focusing on design that requires lower executive function and less cognitive processing and is easier to intuitively navigate (Caspi, 2015)

RBD

Much of this article is based on our previous sensory research article, and the concept of RBD is essential to understanding our approach to aging and to dementia. Following is the introduction to RBD from that article (Orfield, 2013):
With an awareness of the failure of many aging facilities to solve the perceptual problems of the older population, we must begin to reexamine the whole context of elder living. In this process, we must become aware that one of the main reasons for elder deterioration is the deterioration in the structure of the life of elders. Their perceptual clarity is often dramatically reduced, and their cognitive function slows. Their social life is reduced, their physical activity is lowered, and their perception of self-worth is in decline for good reasons. In the field of elder housing, there is often a failure to look at the matrix of quality of life issues and to understand that decline in elders is a logical consequence of many declines and withdrawals from full participation in life. This includes decline in their quality of experience, perception, activity, and social life.

Those of us in the seniors housing field can deal directly with perceptual clarity and therefore increase the ability to deal with these other deficits with a research-based design program. Research-based design normally functions on the basis of a design structure for a new or renovated facility that includes market research and measurement of elder facilities perceived to be high in quality; preoccupancy studies of a baseline client facility via building performance measures as well as subjective measures of the user population; building performance standards development so that the environment will be perceptually clear and comfortable for the elders; perceptual visual juries to measure evoked feelings and associations related to the proposed design options; building performance consulting to ensure that quantitative standards are modeled and met before construction (most architects and engineers need consulting help to engineer or measure at this complex level); performance commissioning to confirm that building performance standards are met; and post-occupancy studies to confirm perceptual comfort and user satisfaction, to be benchmarked against the preoccupancy studies that were completed earlier.

The Building Performance Dilemma

If architectural design were based on the science of human comfort and preference, it could strongly benefit from the fields of building performance science and occupancy research, but unfortunately, it is not. As a result, as the science moves forward for a better understanding of aging and dementia, little suffuses into the design field (Orfield, 2013). Over the decades of dealing with building performance (e.g., acoustics, lighting, daylighting, thermal comfort, and indoor air quality), it is clear that the science has advanced significantly, but its actual practice has reduced significantly at the same time (Orfield, 2013). Since building performance engineering for perceptual comfort has not been commonly practiced for normal populations in the U.S., it is far less likely that it would be understood or practiced for populations with perceptual deficits. Consideration of how to optimize perceptual design for healthy populations is a major exception to normal design practice; aging design has little basis in the profession. A design population that doesn't measure, model, or calculate in simpler building types will be far less likely to be informed in disability-based perceptual and cognitive design.

Practicing architects in the U.S. are normally educated at an undergraduate level, and this education does not normally teach building performance science, modeling, or metrics. There are advanced degrees in building performance and building technology that can be earned at institutions such as Carnegie Mellon University, MIT, Georgia Tech, and others, but even those degrees typically focus on just one of the major building performance disciplines or simply on sustainability (Walker, 2011). This is not to suggest that there is no good available science for building performance; in fact, there is. Much of this science is included in information published by professional societies, including the American Society for Heating, Refrigeration and Air-Conditioning Engineering (ASHRAE), the Acoustical Society of America (ASA), and the Illuminating Engineering Society of North America (IES). Other information is supported by aging collaborations such as the Society for the Advancement of Gerontological Environments (SAGE), the Green House model of the Eden Alternative, Pioneer Network, and Changing Aging. If information about design for healthy populations in working environments were applied to aging, even this small step would be significant. There are several reasons why this science is not applied to the design of most buildings:

- Energy-based engineering is the new focus of
engineering practice over the past 20 years, with far less focus on other areas of building performance. This focus, often represented by the sustainability movement in the U.S., is thought to also include building performance but seldom does.

- Most specialists in architectural and engineering offices are single discipline practitioners (e.g., lighting, HVAC, acoustics, thermal comfort, and indoor air quality); they are unlikely to be aware of the secondary impact of their decisions in their primary discipline (i.e., how HVAC impacts lighting, how daylighting and thermal comfort may be in conflict).
- Architecture has moved much more strongly toward accepting vendor design for building systems, and most vendors do not have a focus on building performance. They focus on energy and budget issues (Orfield, 2015).
- Most building performance issues are not computer modeled to predict quantitative performance values, as most design is repetitive due to computer aided design (CAD) and word processing specifications (the same HVAC, lighting, daylighting, and acoustics details remain constant from project to project). This systematic use of document production tends to institutionalize solutions so that they are not often reconsidered.

Building Performance and Aging

Design for aging often does not consider scientifically which solutions are minimally required so residents will find the environment clearer and easier to negotiate and more conducive to optimal communication. In aging, there is a primary set of declines based on reduction in perceptual performance, and there is a second level of declines that relate to engagement and withdrawal. These include personal, social, and familial withdrawal, cognitive engagement withdrawal, sleep disturbances, dietary quality declines, and cognitive loading. The perceptual declines reinforce the secondary declines, as less perceptual performance normally is followed by less cognitive engagement. These declines can occur along a broad continuum of aging, and baby boomers may be more likely to exhibit these declines earlier than their parents (King, Matheson, Chirina, Shankar, & Broman-Fulks, 2011).

There has been a clear movement toward a social familial model of care in the many variations of aging in place and the broad acceptance of some form of the household model of environment and care. There are models such as Eden Alternative, Green House, SAGE, and Action Pact. The Association of Households International defined the household model as “a place where a small group of residents live that is their home. It includes a kitchen (with a wide variety of food accessible to residents 24/7, including breakfast-to-order and upon request), a dining room, and a living room. It encompasses renovations to an existing building, new construction of households within a building, or single households in the form of cottages, houses, and similar structures.”

While this reframing of two levels of decline has been moving through the research and design community, there is little transfer of this information into the formal practice of aging design. Most of the design efforts are not structured, and most of the studies of the impact of aging environments are not accompanied by formal perceptual measures of either the environment or the relationship between environmental measures and resident outcomes. As we move into the field of care for persons with dementia, the declines in aging are multiplied and confounded by basic cognitive and memory declines. The “darkness” that comes with more limited aging perception is multiplied by the limited comprehension that comes with a lack of cognitive clarity.

Age-Based Perceptual Decline

Normal aging is accompanied by perceptual and cognitive declines that are typical of large majorities of aging populations. Aging brings with it the attendant reductions in resolution and clarity in the visual, aural, thermal, tactile, olfactory and gustatory, vestibular, and proprioceptive domains of perceptual performance and perceptual comfort (Kosslyn & Koenig, 1992). Later in life, often in the same time range as is typical in dementia, these declines are significant enough that reasonable functioning, even with optimal environments, becomes much more difficult. Each of these varied disabilities creates the additional problems of multisensory loss. For
example, as one ages, the ability to have a conversation depends increasingly on visual lip reading (Orfield, 2013). If there are both visual and aural losses of significance, as there often are, the ability to process information from the outside world is decreased substantially. It is helpful to the resident if caregivers can control tone of voice, emotional presence, and appropriate touch. This applies to conversations with residents and caregivers, understanding and following instructions, and hearing summaries of health conditions. Failure to tend to these variables leads to frustration and withdrawal, as the person living with dementia cannot optimally cope and respond to the environment, its overwhelming or complex sensory input, and its multiplicity of demands.

Other Significant Diagnoses

In addition to the perceptual declines and dementia-based declines, elders experience other diagnoses that occur in all populations and that overlay the age- and dementia-based declines; they are not considered in design for aging or dementia by most groups, although the U.S. Department of Veterans Affairs points them out in their guidelines (Department of Veterans Affairs, 2006, 2011). They include serious mental illnesses such as schizophrenia, bipolar disorder, and major depression, autism, sensory processing disorder (SPD), post-traumatic stress disorder (PTSD), physical disabilities, chemical dependency, and medical diseases. By the time an individual goes into assisted living or long-term care, they typically have an average of five major illnesses or diseases. Many of these additional diagnoses create a further need for care and are better served by calmer, clearer, and more accessible environments (Frazer, 2000; Miller & Fuller, 2014). For example, serious mental illness, autism, SPD, and PTSD all benefit from more relaxed, perceptually simpler environments. While each diagnosis may be significantly different, there quite often is a similar sensory response.

Dementia and Common Symptoms

Dementia adds considerably to this problem of perceptual clarity and comfort as we look across the scope of variety of dementia diagnosis, the majority of which are Alzheimer’s disease: vascular dementia, dementia with Lewy bodies, mixed dementia, Parkinson’s disease, frontotemporal dementia, Creutzfeldt-Jakob disease, normal pressure hydrocephalus, Huntington’s disease, Wernicke-Korsakoff syndrome (WKS), traumatic brain injuries, and Chronic Traumatic Encephalopathy (CTE). The most common symptoms of those living with dementia include memory loss, confusion, impaired judgment, visual-spatial disorientation, sleep disturbances, and difficulty with language and eating. Most of these symptoms can be exacerbated by caregiving protocols that do not attempt to compensate for the disabilities associated with dementia.

Dementia can also be exacerbated by environmental difficulties with a lack of clarity, poor way finding, poor communication, and limited understanding of context (Walker, 2011; Caspi, 2015). So the quality of the interaction inherent in caregiving and the communications degradation of the environment both present significant complications for many of those living with dementia. While the newer models of social familial care improve and clarify the communication with the caregivers and reduce the complexity by limiting the “family size” to 10 to 15 residents (small-scale environments), the environment has the additional potential to reduce the confusion in aural and visual communication and interaction. It is also helpful when dealing with the perceptual and cognitive complexity of information processing and way finding.

The Changing Intent of Dementia Care

The history of what we often call “memory care” as a euphemism for dementia care is long and difficult to study. Via the institutional destination of the “special care unit” (SCU) is a history of providing protective and secure care for the resident with dementia. In these SCUs, there is a tremendous variability in environmental quality and quality of care. This care has traditionally focused on moving individuals into structured care when their care is too difficult for their caregivers and family care partners; they exhibit disturbing, embarrassing, or unsafe behaviors; they cannot share significantly in their own care; and there is no family or friend to support their independent living. The best traditional care memory units are safe and secure for residents, but they play a...
limited part in the quality of life of the resident. These care models are based on the belief that care is about protection and security (Caspi, 2015). The newer care models recognize that dementia care needs to also focus on user experience and to maintain the quality of life of the resident as much as possible. The newer care model is clear in arguing that the speed of decline in dementia has a lot to do with how much of the life of the resident is supported and preserved by the care system, care staff, and the environment. Furthermore, these care models must be staffed by a workforce trained in an acceptable standard of dementia care.

Design for Dementia

The application of building performance science to the environments of the aging population can dramatically improve perceptual clarity, and this can increase the capabilities of the elders with regard to the frequency and type of activity and communication within their environment (Walker, 2011; Orfield, 2013; Caspi, 2015). This is helpful in inhibiting withdrawal due to limited perceptual capacity. Without clarity, the resident may become lost on the way to the dining room or living room and may eventually withdraw due to the perceived difficulty of walking through the space.

With regard to residents with dementia, there are often additional declines in vision and hearing, as well as the cognitive declines that reduce the cognitive clarity of what is seen and heard. Some of these declines include narrow field of view; lowered gaze; reduced visual–spatial orientation; failure to recognize shapes; misinterpretation of complex visual scenes and misperceptions of visual images such as shadows, reflected images, mirrors; hallucinations; and reduced depth perception beyond normal loss of stereopsis. These are often accompanied by cognitive declines, including memory impairments; inability to express oneself; impairment of executive functions; difficulty with task initiation; poor judgments about safety; uncertainty, insecurity, and fear of failure; and misidentification of objects (agnosia).

As a first step, design for dementia must use the perceptual strategies for increasing perceptual clarity and reducing perceptual noise as a strategy to compensate for perceptual declines that are typical in aging. Design for aging should also use these strategies, as most aging populations have significant subpopulations of early stage dementia. In addition, there are a series of additional strategies that are supportive of greater perceptual clarity and reduction in cognitive- and memory-based declines. In other words, as we move into dementia, we must further clarify the world of this population, and we must begin to deal with much simpler cues to orientation in terms of:

- What time is it?
- Where am I?
- Why am I here?
- What can I do to help?
- Am I supposed to go somewhere now?
- How do I get there?
- What is the cause of my fear?
- What is the cause of my discomfort?
- When am I going home?
- Why am I afraid?
- Why do I hurt?

The environment typically seen in nursing homes and assisted living facilities is, to a large degree, distracting and difficult for the population of residents with dementia, as dementia populations, on the whole, do not have a complex goal of living in aesthetically pleasing spaces. It is generally a narrower goal about making it through the challenges of an hour or a day. Thus, our design needs to be about clarity and not style, and we need clarifying and familiarizing cues in the personal space and in the general space. We need such cues to help answer the questions that are no longer clear to the resident with dementia. All the decorative design to the general space, from patterned wallpaper and carpets, to fancy lighting and upholstered furniture, must now be redirected to practical questions of what spaces are about, how to move between them, and what the destinations are supposed to be like. The purpose of spaces must be clear, and simplification must be a basic intent. This is not to say that we do not also consider the visitor and staff, but there are formal techniques to measure the impact of environments on each group while using the elder as the baseline focus (Carlson, 2010). Thus, a complex
carpet must become a simple way-finding walkway, a complex wall must become a clear contrast to the floor, and the two together must become a simple outline of a hallway with little detail that does not contribute to the understanding of the carpet path and the hallway's shape. A more complex hallway may cause confusion, misinterpretation, and injuries due to walking into the walls or falling after interpreting the carpet pattern as a set of objects dropped on the floor. All design must support the resident's capacity to translate aspects of the environment into meaningful cues.

As we move from the private room down the hallway and into general living and eating areas, we need the same clarity in finding the seating areas, identifying the shapes of chairs, tables, and lamps, and ensuring the normal decorative detail gives way to shaping and way-finding detail so that the design does not add to perceptual complexity and confusion. Some of the design issues for dementia residents include:

• way finding
• scale of environment: smaller is better
  o As we deal with populations of persons with dementia, even the U.S. Department for Veterans Affairs is moving toward household-scale environments, which normally have 10 to 15 residents and a cross-functional, non-institutional workforce.
• complexity: limit objects in room to what is necessary
  o consider each element from each view, remembering that the two viewing conditions are daytime, when visual adaptation is high, and nighttime, when it is low
  o avoid complex design, with patterned carpets and walls, furniture with different colors of seats and backs, dark furniture that cannot be seen at night
  o outline all openings and pathways, assuming low visual acuity and poor color vision (color discrimination)
  o use familiar objects, individualized music, and a person’s history clearly visible to residents in their rooms
• signage
  o detectability: create signage that conflicts with environment in order to be noticed
  o legibility: must be very high
  o simplicity of words, not signs
  o position for standing/seated/wheelchair reading
  o electronic coaching systems for way finding, assuming visual disabilities; technologies like iPhones with guidance programs or dedicated navigation systems with voice component or other cues
• metaphorical logic
  o Does it look like it is supposed to?
  o Does it suggest typical uses?
  o Does it remind me of home?
  o Are most views short and clear?
  o Is it user friendly?
• visual contrast—monochromatic and color contrast
  o floors versus walls
  o furniture versus background
  o fixtures versus background
  o doors versus walls
  o door handles versus doors
  o controls versus background
  o paths for walking
  o landmarks
  o contrast and color contrast at all scales
  o architectural
  o interior navigation
  o furniture
  o implements such as places and silverware
• luminance balance
  o ensure all objects in the field of view are in the visual adaptation range of daytime and nighttime via correct lighting, daylighting, and finishes
• gloss and reflections
  o all finishes should be matte (non-glossy) for clarity and lack of reflections
• camouflage for concealment for security and simplicity
  o items that must be seen should be very clear for simple and quick detection, such as bathroom fixtures that contrast with the room finishes
Most of the perceptual design decisions that must be made have good science behind their use, and we use quantitative models of each of these issues in aging design. Most of the dementia design decisions are partially resolved by the aforementioned perceptual design decisions, but many others are in need of outcomes research focusing on dementia-based user experience analysis. This requires the conceptual framing and subsequent measurement of the impact (benefits or limitations) of any changes implemented with respect to the population of persons living with dementia. The ultimate goal is to determine what works best to maximize the daily functioning and quality of life for residents. Is there a measurable decrease in the percentage of falls in a facility? Does the level of agitation or percentage of aggressive outbursts decline to a statistically significant level? Do the relatives of patients note observable changes in their capacity to communicate post-implementation? And, in earlier-stage dementia, is the user reporting a decrease in the experience of distress and displaying increased cognitive capacity due to decreasing the environment complexity and/or reducing environmental variables that contribute to stress? The user experience is the ultimate end point for inferring the success or failure of any modifications.

**CONCLUSION**

The application of quantitative standards and the science of modeling to design for dementia is beginning to be developed into a coherent practice that can be validated in the design phase of a new or renovated project. This is true of seniors housing, nursing care, and health care environments (Palmer, Counsell, & Landefeld, 2011). The knowledge is available, but it is unknown to most designers. Even those who are aware have few of the tools necessary to use the design process detailed previously (knowledge, standards, computer models, and measurement instruments). As with all building types, a good building is not a more expensive building, but rather it is a more highly intentional building designed not for the public or the visitor but primarily for the user under the care of the organization. In our world of practice, everything is about the user and the benefits to the user, and design must be based on good science. At this time, this RBD practice is rare around the world and in the U.S. There is great potential that this will change in the near future with the advent of research pertaining to aging and dementia and increasing concern for the well-being of the elderly and the disabled. Care organizations will likely take the lead with this effort, as their orientation is closer to the users’, and they must insist that scientifically based design research be
available that supports the needs of the populations they serve. As with all aging design work, there is a real struggle in this regard. Many architects feel they know aging design, and many are unaware that there is good science as yet. In our work on all building types, the care organization is generally highly supportive, but we must be careful when helping them select architects who believe in RBD. In our early aging projects, this has so far been a success, but it is one of the crucial steps. A bad design team essentially precludes a good project and one with good science applied to it.

Case Study

In our last article, we discussed the first major project worldwide to use this RBD process and our new standards for multiple buildings, including memory cottages, long-term living, and a well-being center. This project for Western Home Communities in Iowa opened its two memory cottages in 2015, and the issues we are now discussing will be quite evident in the design of these cottages. Both buildings, as household designs, are freestanding cottages that are identical in design. This similarity was specific so that control group studies of environmental changes could be completed on this campus.

Postscript

As we look at aging and dementia, it is important to keep in mind that the world in general is becoming more complex, and the children of the older adults are living in a highly technological world with lower personal contact. Many of the current older adults grew up in a time when there was limited access to phones, little television, and no computers, voicemail, e-mail, and cell phones. Their lives were lived much more in the real spatial world, and their patterns of activity and health were better than subsequent generations. Their children are much more intensely involved with and oriented to technology, often with lower levels of concentration and personal connection. Thus, we have the challenge that life patterns for many older adults are different from the patterns of their children, and this has implications for older adults and for the caregiving and involvement of their children.

It is also important to also keep in mind that there is increasing evidence that the withdrawals that occur with increasing age are occurring earlier in each subsequent generation. These withdrawals include a lack of stimulation in the auditory and visual communications domain, lack of social or familial involvement, and lack of exercise. Health data from a number of studies suggest that each generation is physically less fit and less socially connected than the preceding generation. There is clear evidence of this with regard to baby boomers and their parents, so the considerations discussed in this article for aging and dementia may well have application in younger generations, who are more removed from many aspects of life and more intensely living in the virtual world. This is likely to correspond with earlier onset of cognitive declines as this population ages.

Acknowledgements

I would like to thank three experts for reviewing and adding suggestions to this article: Eilon Caspi, PhD, Ethelle Lord, DM, and Angela Orfield, PsyD. All share a “person first” view of residents living with dementia.

© 2015, National Investment Center (NIC) for the Seniors Housing & Care Industry

Author

Steven J. Orfield
Orfield Laboratories, Inc.
2709 East 25th St.
Minneapolis, MN 55406
steve@orfieldlabs.com
612-721-2455

References


Department of Veterans Affairs, Office of Facilities Management. (2006). *Nursing home design guide*.


