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Environmental Modifications for Persons with Disability

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Environmental Modifications for Persons with Disability

By

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This Scholarly Project Paper, submitted by Jacob R. Bryan in partial fulfillment of the requirement for the Degree of Master’s of Occupational Therapy from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and is hereby approved.

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CHAPTER I
INTRODUCTION

Occupational therapy (OT) is a discipline that focuses on functionality. Therapy can take many forms but the scope is always to enhance the client’s ability to perform within his/her functional roles. When a client presents with physical or psychosocial issues, the therapist will take note of how the impairment affects all facets of the client’s life. This global assessment provides occupational therapists with the insight to determine which therapeutic approach would be the most beneficial for that particular client. However, if a client were to present with an environmental issue, a global assessment would commonly give way to an assessment that would only look at accessibility. Many underlying causes for dysfunction will go un-noticed when nothing else is evaluated.

Accessibility has no official definition within the Occupational Therapy Practice Framework Domain and Process (AOTA, 2003), but it gives the connotation of physical admittance and navigation within an environment. Accessibility is an important aspect within a functional home environment; however, it is not the only factor that needs to be evaluated. What is done within the walls of a home will contribute a great deal to self image and quality of life. Most activities of daily living (ADLs) occur within the home as well as many other occupations that help define the individual. Because this environment is home for so many of life’s activities, it needs to be evaluated in the same way that
an occupational therapist would approach any other problem. By completing a global assessment on the environment, the therapist will not only create an accessible home, but also a functional refuge in which the client can feel safe and productive.

Very little literature is available on home modification within the context of occupational therapy. When it is addressed, it will often take the overtone of accessibility rather than a more global outlook. Some environmental modifications in response to cognitive issues have been documented as well, but they are still singular in purpose and do not look at the bigger picture. Environmental modification outside of healthcare is exclusively aimed toward accessibility. Within architectural circles, accessibility is defined by pages of building code and structural terminology. All focus is placed on meeting national and regional specifications for the building and no attention is given to the actual client. It seems necessary that a client centered approach to environmental modification be established in order to consider all the facets of a client’s life. This approach needs to include client factors as well as occupation to ensure functionality within the environment in question.

This document will address the topic of environmental modification by first exploring the literature that has been provided by disciplines within healthcare and then by those that are more directly responsible for physical construction. After the literature has been reviewed, the process behind the gathering of information and idea formation will be explained and justified. The product of this research will then be presented and this includes client information
forms, educational supplements for the therapist regarding environmental modification, and an environmental needs inventory. Finally conclusions and recommendations for future projects will be provided.
CHAPTER II
REVIEW OF LITERATURE

Every day, millions of people wake up, hop out of bed, prepare themselves for the day, and rush out the door to make it to work on time. For those without a disability, the interactions with the environment that take place to accomplish these simple tasks are done with little effort or thought, but to those with impairments, these tasks may be daunting. In fact, one out of every thirteen people in this country aged 18-64 reports having a disability (Houtenville, 2004). This also means that one out of every thirteen people must find solutions for environmental access in some degree. Everything that happens in this world requires a level of interaction with the environment around us. The ability to access the environment and perform therein will ultimately dictate our success in any given task. The ability to modify and control the surrounding environment will be the solution that will assist special needs populations in succeeding in the fast paced, high demand world in which we live.

A Need for Change

The United States is facing an interesting time in its history. Both the elderly population and those with disabilities are asking for help and funding from a government that is experiencing economic insecurities. To aggravate the issue, this country has never before seen an aging population as vast as the one on the horizon. Miller (2003) documents four social issues that demand the attention of
not only the health care system in this country but also of all those who use it. First, within the next thirty years the elderly population will go from 13% of our population to 20%; a number unprecedented in U.S. history. Second, with the staggering rise of medical visits, rehabilitation, and emergency hospital visits, the medical professions will need to find better ways of prevention rather than just better treatment. Third, as of January 2003, an estimated 340,000 elderly people will suffer from fall related hip fractures per year. This number is estimated to be around 500,000 by the year 2040. This statistic is alarming not only because of the number of incidences but also the fact that between 30-50% of those fall victims will not be able to return to their homes or live independently after their fall. Finally, the very nature of aging and the comorbid conditions involved require multiple disciplines to be actively engaged in the prevention of accidental injury and death (Miller, 2003). Shamberg and Shamberg (1996) explain that this aging population is more desirous to remain in their own homes throughout their twilight years than ever before. The authors note a study completed in 1990 by the American Association of Retired Persons (AARP) showed 86% of the elderly population wanted to remain in their homes as long as physically possible. According to Shamberg and Shamberg, this shows growth from study of the same design that was completed by the AARP in 1986, which indicated the desire of 78% of the elderly population to “age in place”. An eight percent growth in just four years shows an increasing desire among the aging population that they want to age at home. Most of the members of this population are home owners and have lived in their current residence for over 20 years; most of which are
mortgage free (p. 22). With such high numbers of accidents among this population, but an overwhelming desire to stay at home, the healthcare community needs to heed the advice of Miller (2003) and take transdisciplinary action to prevent and assist where possible.

What Can Be Done?

With such daunting numbers before them, and emotion felt for the people these numbers represent, the healthcare community has a great deal of work to do to assist these special needs populations to be as functional and independent as possible. It should be noted that the steps taken to help the elderly population can also be generalized to other special needs populations thereby helping a stretched medical community assist as many as possible. In response to the statistics displayed above, Miller (2003) suggests that the medical system needs to expand to include programs that focus on prevention rather than treatment. In fact, the author suggests three prevention programs that will address the various situations of those who are participating.

According to Miller (2003), the first of these programs is a primary prevention program. In this program both licensed occupational therapists (OTs) and OT students provide various services to prevent the onset of various conditions. These services consist of:

- Community education of risk factors associated with age and/or other disabilities
- Consultation with community agencies to develop a form that can be used in clients homes to prevent falls and remove hazards
• Topic groups that cover topics such as the fear of falling, how to participate safely in every day activities and strategies to avoid dangers within the community so as to avoid falls or other accidents (these groups would also address when clients should look to others for help)

• Provision of literature in medical offices and community places that describe the risk factors involved in falling and strategies for prevention

Miller (2003) goes on to suggest another program to cover what she calls secondary prevention. Secondary prevention is what is put into action once a person has demonstrated early symptoms of any degenerative disease. Once this disease or condition is identified, the following steps can be taken as part of the secondary prevention program:

• The medical team and client can screen the home and work environments for potential health hazards and the team can take the measures necessary to remedy any situation.

• An interdisciplinary fall prevention program can be developed for those community living individuals that qualify for the program.

• The client will work with this interdisciplinary team to develop activities and/or modify occupations to increase strength and endurance so as to prevent falls.

• After all the previous steps have been taken, the team will then assess the individual and make the appropriate referrals to the health professionals that can help the client with the more specialized issues (p. 13).
In Miller’s (2003) original program, the criteria were fixed so only individuals that were over 70 years of age, were still living within the community, and had a medical history showing need could participate in the program. This included a history of doctor visits and hospitalization, not to mention physical conditions like postural hypotension or adverse effects caused by current medications. It is the author’s hope that the clients who participate in this secondary program will take the steps necessary to stay at their current stage of the pre-identified disease or condition and not regress and require the third prevention program.

According to Miller (2003), tertiary prevention programs are provided in response to disability. The clients that take advantage of this program are too involved for primary or secondary programs and usually require all the attentions of licensed professionals. This program will usually start in an in-patient hospital environment and be carried through to a post discharge environment. As part of each hospitalization phase and eventual discharge, the OT and other healthcare professionals will determine whether the clients risk of a fall is low, medium, or high. The client will then receive education pertaining to their level of risk and the proper specialties will be involved to help special needs clientele (p. 13).

Miller’s (2003) programs respond to many of the questions we are facing right now in healthcare but may be too involved to incorporate at many facilities. The organization and interdisciplinary collaboration that this project would demand could potentially take quite some time to set up in a functional manner. Like Miller, however, there are other therapists (Shamberg and Shamberg, 1996;
Painter, 1998) that feel that something needs to be done to increase functionality and decrease risk for those clients with debilitating conditions so as to increase quality of life and community contribution.

Shamberg and Shamberg (1996) agree that all clients need education regarding their condition and how they can be safe. They do not have separate prevention programs, as did Miller (2003), but they take into consideration the client’s condition and focus on their home environment to increase his/her functionality and safety.

As was previously mentioned, the concept of “aging in place” is becoming more popular all the time (Shamberg & Shamberg, 1996). The authors, however, point out that the need for the modifications is not only in the aging population; there is also a strong need for these services among those with disabilities.

Shamberg and Shamberg (1996) note that occupational therapists who participate in environmental adaptation should become very familiar with architectural design, barrier-free design, universal design, and construction. Having the knowledge of these areas will better qualify the OT to inspect and suggest modifications and understand if these modifications are going to be feasible and practical. The authors also make the point that the modifications should follow a prioritized system of needs before luxuries. This system takes into account the clients budget and then lists those things that are needed for the client’s safety before anything else on the list. Once the necessities are paid for, luxuries can be purchased with the remainder of the budget. The OT is
responsible to meet with the client and determine where his/her priorities lie before starting any of the planning for the modification.

Sensory Impairments

As examples of prioritized modifications, Shamberg and Shamberg (1996) list some common modifications for various conditions. For individuals with poor/degenerating eyesight, basic modifications should include:

- Increasing lighting wherever possible
- Contrasting the color of work surfaces and floors so that the client can identify their location in respect to other objects in the room
- The use of tactile indicators (such as raised lettering) and audio indicators (such as a voice output) on appliance controls and wherever else they are needed
- Eliminating busy and/or confusing patterns on rugs, wallpaper, or upholstery
- Removing unused clutter and/or furniture out of busy thoroughfares and popular rooms within the home
- Bathroom grab bars need to contrast with the tile or other bathroom decor for instant recognition and access in case of fall or other emergency
- Finding and incorporating adaptive equipment such as magnifiers, lighted switches, and large font computer programs to assist the client with everyday tasks (p. 24)
It is important that the condition is foremost in the mind when considering any change within the environment (Shamberg and Shamberg, 1996). The authors emphasize that the therapists who follow this rule can even help clients with conditions such as hearing loss. Some examples of modifications are:

- Rearranging furniture so that individuals will be face to face when speaking with one another
- Provide amplification devices for use with the TV or telephone
- Setup multiple stations around the house that have pens and paper handy for use in communication
- Use vibrating alarms and timers that can be kept on the client’s person to replace alarm clocks, cooking timers, etc. (p. 25)

As with any modification, the changes need to be matched to the client’s needs. Not all of the examples above should be used with every client, and some clients will require more. Any condition that can prevent a client from being independent or safe should be examined to explore any possibility of a more functional environmental solution. By doing this the client and OT can develop a sanctuary in which the client is safe and functional (Shamberg and Shamberg, 1996).

According to Shamberg and Shamberg (1996), too many individuals are forced out of their familiar home environments into group facilities or institutions before other possibilities are explored. With the proper home modifications, senior citizens and those with disabilities can live with the maximum level of independence possible in an environment that they can control and in which be
successful. Along with this conclusion, the authors also point out that in order to accomplish this, the OT needs to have a firm understanding of accessibility issues, architectural products, assistive technology, universal design, and construction. Where the OT must go to get this education is not determined.

Degenerative Cognitive Disorders

Home modifications are also being incorporated into the treatment of degenerative diseases such as Alzheimer’s disease. Painter (1998) wrote an article on how an occupational therapist can assist those with Alzheimer’s disease at every stage of degeneration.

Alzheimer’s disease is a devastating debilitating condition that progressively strips the cognitive ability of an individual to function independently. This disease will eventually progress to the point of complete reliance on outside help for even the most basic of daily activities. However hopeless this condition may seem, there are things that can be done to increase a person’s functional level and quality of life throughout the progression of dementia of the Alzheimer’s type (DAT). Painter (1998) wrote this article as a guide to lead therapists to those environmental changes that will give the client the best advantage possible in their vanishing world. The author identifies three areas that require the attention of occupational therapists: environmental cues, environmental stability, and person-environment interaction and reactions (pp. 25-27).

Environmental cues are changes made to the client’s surroundings that will provide clues to his/her functional performance. These cues will change with
the progression of the disease and with the areas of performance that the client is working on. Physical environmental cues may consist of painting a door the client’s favorite color for easy recognition, or perhaps hanging a picture of the client with the words bedroom written in big letters. These are changes to the physical aspects of the home to increase function (Painter, 1998).

Social environmental cues are changes that may promote interactions between those that share a space. The diffusion of highly personal objects throughout the space can help the individual feel as if they can access the whole space and make it more likely for social interaction. This kind of object disbursement can also assist the client with self-identification (Painter, 1998).

Psychological cues are developed by establishing a common emotional tone in the spaces where the client will be. By creating a familiar ambience, the client is more likely to be functional. Techniques may include changing color schemes, daily schedule organization, and overall aesthetics for the whole space. These changes will provide the client with psychological motivation to perform in a familiar environment (Painter, 1998).

Stability of the environment is paramount for the function of the client. The therapist must assure that the changes being made are both necessary and effective. Unnecessary changes will undoubtedly result in confusion and disorientation. Every change needs to weigh its effectiveness against its adverse consequences. It is also important to note that the more environments the client is exposed to the more confusion he/she will exude. By maximizing the quality of
changes to the client’s environment the therapist will not have to change as much, thus minimizing confusion (Painter, 1998).

Finally, Painter (1998) explains that the person-environment interaction is what the therapist must evaluate to determine the success of the treatment. This interaction is the outward manifestation of the client’s feelings. If the environment is foreign and/or confusing the client may react with outbursts of anger, confusion, demonstrate rocking or wandering, or just resort to following the caregiver wherever he/she may go. When the client can start experiencing successful interactions with objects and people without these unwanted reactions than the therapist can conclude that the modifications were successful.

Painter (1998) concludes by explaining that environmental safety procedures and orientation techniques need to progress along with the disease. As the client becomes less able to protect him/herself, the therapist must identify the new threats and adapt the environment accordingly. Though the biggest prerequisite for this type of intervention is a working knowledge of Alzheimer’s disease, an understanding of basic architectural and construction principles is still required for successful modifications, even in a degenerative disease context such as DAT.

Silverman (1989) also shares the opinion that environmental modification can greatly improve the quality of life for those individuals with DAT. The author outlines many of the same techniques mentioned above but also adds the fact that the home environment needs to be clutter free allowing for a straight line of site throughout the home and open areas that promote activity and
socialization. The addition of pets or a small menagerie was also suggested as a way to enhance health and budget permit. Perhaps the most notable addition offered by Silverman (1989), however, was the experience of a facility known as the Hebrew Home for the Aged at Riverdale. This facility had made no major changes to their original floor plan nor had the funds to build a new unit for their DAT clientele; they simply had made a number of creative adaptations to the space that was available to them. The changes included color coding of doorways and hallways, opening up available space to increase the area available to socialize and do activities, and personalized the doors to the clients’ respective rooms to provide visual cues to stimulate memory. Four months following this simple renovation a preliminary evaluation indicated that the level of anxiety that clients experienced within the facility had been reduced, the number of client accidents had decreased, and there was a serious decrease in the negative behaviors that accompany DAT. Silverman (1989) concludes that while the care may not change from one environment to another, the care put into providing a functional environment can make a substantial difference in the quality of life of the clients.

Elderly Populations

Other facilities have also followed this practice and developed tests to monitor the effectiveness of environmental modifications for persons with disability. One such study emerged from the Washington University School of Medicine headed by Stark (2004); an instructor at the university in the occupational therapy program. The purpose of the study was to examine the effectiveness of home modification for elderly persons with disability. This was
done by contrasting self-reported occupational performance, gathered through the Canadian Occupational Performance Measure (COPM), before and after the modification took place. Thirty elderly clients were enrolled in this program between July 1999 and June 2001. Each of these thirty clients then took an interview version of the Functional Independence Measure (FIM). The FIM is organized in a way that high scores represent higher levels of function and the low scores indicate low function. Those individuals that scored less than 25 in the cognitive subscale were dropped. Due to this criterion, and other extra curricular factors, only sixteen of the original thirty clients remained by the end of the study.

After baseline data was collected on each of the clients, individual modification plans were made based on the information gathered. The home modifications included adaptive equipment, architectural modifications, bathroom modifications, and major home renovations. Other than these environmental modifications, no traditional OT services were given during this time for these individuals.

The average time between the initial evaluation and the follow-up sessions was about 6 months. Pictures were taken of the environments before and after and identical assessments were given to the clients. A total of 75 barriers were identified in the homes of the participants. Each individual received modification services for about half of the identified barriers within the individual’s home. The most frequent modifications that were utilized were grab bars, handrails, and ramps. Less prevalent modifications were widening doors, relocating laundry facilities, increasing lighting, and providing bed rails. Only 45 of the original 75
barriers were resolved due to miscellaneous circumstances out of the control of the research team. Even though many issues were unable to be addressed, the pre and post scores of those 16 individuals differed drastically. The average pretest score for performance was 3.19, and the average post score for performance was 7.81. The pretest average for satisfaction was 2.25, and posttest scores averaged at 7.69. These results are in support of current theory that the removal of environmental barriers will increase performance and satisfaction. These results are also important because they support a client-centered approach to therapy and intervention. This is the first attempt, to the knowledge of the research team completing this study, to address the topic in this way. Data collected from the study indicates that performance and quality of life increase dramatically when environmental barriers are removed from ones home (Stark, 2004).

Physical Disabilities

Dr. Peat (1997), a professor and director at the School of Rehabilitation Therapy for Queen’s University in Ontario, Canada, notes that persons with physical disabilities are often deprived of the same “rights, privileges, and opportunities” that others enjoy simply because of environmental barriers (p. 657). In a similar article, Ahasan, Campbell, Saloni, and Lewko (2001) state that an accommodating environment is imperative for individuals with disabilities to live full and meaningful lives. The authors point out that multiple studies (Kettunen, 1994; Benkton, 1993; Gongxia, 1992) have indicated that environment will impact the function and overall satisfaction of persons with disabilities (p. 175). The authors also note that the proper home modifications and technologies
will increase productivity and thereby raise the client's concept of self worth overall happiness.

According to Peat (1997), many of the issues surrounding environmental accessibility were not being addressed in either the public or private sector until the United Nations decided to take action. Because of the injustices dealt to those with disabilities, the United Nations (UN) began an international campaign to set up standard rules that would ensure individuals with disability the same rights and freedoms that others enjoy. This campaign began in 1982 and lasted until 1993 and became known as the “United Nations Decade of the Disabled” (p. 657). At the end of this decade the Standard Rules on the Equalization of Opportunities for Persons with Disabilities was developed by the UN, which displayed a moral commitment to those with disabilities, but it was unenforceable in any government. It is unknown whether it was this movement that sparked action in the United States (US), but toward the end of the UN’s “Decade of the Disabled” (p. 657) the US congress adopted legislation that would ensure, by law, the accommodation of those who have disabilities. The Americans with Disabilities Act (ADA) was signed into law in 1990 and has since required that all reasonable accommodations be made for individuals with disabilities. Because there were no standard building codes, however, there have been many different ways that organizations or private parties have gone about making those changes. The International Code Council Inc. (ICC) was established in 1997 to provide consistency to the chaotic rules and regulations that had been previously used, not
only for accessibility, but also all other aspects of construction and architecture (ICC, 2002).

Ahasan, et. al (2001) state that these codes and construction personnel alone are not sufficient in making a home safe for an individual with disabilities.

“A safe, convenient, sound, and healthy living environment is the prerequisite for a good house for the people with special needs… [But] Often the builders do not know all the factors to be considered that can maintain a safe, hygienic, and healthy environment (p.175)”

The authors continue by stating that, in order to create an environment that meets the individual needs of a person with disabilities, findings from an analysis of the client’s skills and functional levels needs to be the driving factor behind the changes. Therefore, a collaboration is needed between the contractor and the medical professional so all aspects of the client are taken into consideration and addressed (2001).

Why Are Occupational Therapists Right for the Job?

The role of occupational therapy is to help the client gain or regain function through activities meaningful to the client. This places therapy at a highly personal level for both the client and the therapist and service settings can fall into a continuum from inpatient to home and community care. For this reason, an OT is a perfect candidate to help the client with the transition from a controlled medical environment to a highly personal home environment. Burgess (1999), an OT, documented this experience as she assisted one of her clients return to home after hospitalization. This article covered various aspects of home modification and Burgess wrote from the perspective of her first experience with
home modification. In the article, the author explains the steps she took to make the modification a success.

First, Burgess (1999) emphasizes the client and the client’s needs. This is always the first step in understanding which modifications will take place. The client, in this case, was under Burgess’ care recovering from a stroke. This gave the author first hand knowledge as to what changes needed to be made to the home environment to accommodate the client’s functional level. The environment the client will be returning home to needs to reflect the client’s functional level at the time of discharge and needs to be able to adapt as the client’s functional levels change over time.

According to Burgess (1999), the friends and family that will be surrounding and helping the client will become the therapist’s first consultation team, since they are the ones that are going to be the client’s support network after discharge. These are the first people the therapist will consult with as to the changes that need to be made. In discussing the situation with the client and his/her support network, the therapist can uncover many of the determining factors in the transition from hospital to home.

Burgess (1999) notes that funding, both private and federal, is one issue that will be discussed before much else is pursued. This will be one of the main determining factors as to what can be modified. With this knowledge, the therapist can go to the appropriate outside resources that are specialized to help such as architects, contractors, durable medical equipment resellers, etc. The author then points out that there are very few pre-existing networks of this kind
and the therapist may have to create one. Not all these professions will need to be involved in every case; however it is important that they be utilized to the extent that the budget will allow ensuring the quality of the end product. Consultation with this team of professionals will assist the therapist in understanding which services should take priority. Burgess states that in many cases the role of OT will be that of mediator and advocate for the client since he/she knows the client’s functional level. She concludes by stating that in the future, environmental modification may become more common for the OT due to aging populations and community based practice. It is for this reason that OT’s need to develop these networks now, so we will be prepared for what may await us in the future.

In a related article, Sevigny (2000) documents reasons why an OT is qualified to be the liaison between the hospital and the home and emphasizes the appropriateness of occupational therapists as home assessors. The author points out the fact that the OT can do more than simply inspect the house for physical dangers. Every OT has training not only in physical disability but also psychosocial aspects of life. This background gives the OT the ability to recognize cognitive or psychosocial issues that could potentially lead the client into a dangerous situation. Sevigny also notes that an OT has the training necessary to consider all the issues surrounding the client before reaching a conclusion. This global picture of the client may have a strong influence on safety and how and where modifications can take place within a home. If a client has lived in a place for thirty years, the OT will know that his/her suggestions need to take that into consideration. Few people in that position will let the OT
have free reign of the house, so the special training of the OT is perfect for empathizing with the client and problem solving with the resources available. Sevigny also touches on the process OT’s should use when inspecting a home. The author emphasizes that changing the environment alone would not be effective; the change would also have to be accompanied by an example from the therapist of how things will work and client practice within that environment.

Finally, Sevigny (2000) points out that there are five aspects of the client that are looked at when the OT does an assessment: environment, cognition, sensory, physiological/neuromuscular, and psychological (pp. 12). Every concern that emerges will fall within one of these areas, all of which are covered by the OT’s evaluation. The OT then takes what is found and makes sure that the eventual solution is wholistic in its response to all five areas. Even a change as seemingly simple as an environmental modification will have an impact on most of the other aspects of the client’s well-being. Sevigny (2000) concludes with an admonition to all occupational therapists stating, “It is our responsibility to redefine the value of occupational therapy within the home evaluation market. The only barrier I foresee is our own lack of action (p.13).”
CHAPTER III
METHODOLOGY

The collection of literature used in this document was performed primarily through searches within a medical library and consultation with professionals. Information on environmental modification within the context of occupational therapy was found to be almost exclusively in monthly publications recounting projects and experiences of practicing therapists. These articles ranged from physical modification for accessibility to cognitive orientation. Journal articles were also incorporated into the review but were primarily written by disciplines other than occupational therapy.

Resources outside healthcare were also utilized to help educate healthcare professionals in technical terminology and procedure associated with building and zoning laws. This information was pulled primarily from the International Code Council (ICC), and Assist Inc. The ICC is made up of architects and other building professionals that represent a number of organizations within their respective fields. Their purpose is to develop international building standards and terminology that will synchronize professionals within their respective disciplines (ICC, 2000). Assist Inc. (Assist, 2002) is a non-profit community design center. Their efforts are focused on architectural design, community planning, and development assistance to other non-profit and community groups. Assist Inc.
also provides housing and accessibility design for low income households and individuals with disability.

Consultation with architects and other construction professionals was done in the early stages of research to determine what information from their fields would be the most valuable to occupational therapists throughout a home assessment. This guidance has led to print sources included within the literature review and the product. The final product of this research integrates information published by healthcare and architectural communities in a way that can be used to benefit individuals with special needs.
CHAPTER IV

THE ENVIRONMENTAL NEEDS INVENTORY (TENI) AND EDUCATIONAL SUPPLEMENTS FOR HOME MODIFICATION

Introduction

Occupational therapy is a unique discipline that requires all facets of a client’s life be considered and then treated accordingly. Sevigny (2000) points out that there are five aspects of the client that are looked at when the occupational therapist (OT) does an assessment: environment, cognition, sensory, physiological/neuromuscular, and psychological (p. 12). These categories are described in further detail within The Occupational Therapy Practice Framework Domain and Process (AOTA, 2002). In addition to the framework, there are models of practice within the field of occupational therapy that guide the therapist through this complex process of fitting the appropriate treatment or assistive device to every client’s unique situation. This provides intervention that addresses immediate concerns while staying true to the client’s self concept and value system. The purpose of this document is to integrate existing occupational therapy materials with information published by architectural communities in a way that can be used to guide therapists through the process of environmental modification.

Environmental modification is a form of treatment that will impact how clients access the world around them. These modifications will often incorporate
existing or predicted assistive technologies in addition to the areas of the client’s life that are addressed in the professional framework. This document utilizes the Human Activity Assistive Technology (HAAT) model of practice (Cook and Hussey, 2002) as well as The Occupational Therapy Practice Framework Domain and Process (AOTA, 2002) to address these issues.

Cook and Hussey (2002) developed the HAAT model of practice to match the client’s needs to appropriate assistive devices and services. This model focuses on the client (or human) and his/her occupations (activity) to find the technology that would be the most congruent with them. This is all considered within the contexts of the client’s life. The Human, or client, aspect of this model would look at Performance Skills, Performance Patterns, and Client Factors, as described in the Occupational Therapy Practice Framework Domain and Process (AOTA, 2002). The Activities portion of the model would then address the client’s Areas of Occupation as described in the Occupational Therapy Practice Framework Domain and Process (AOTA, 2002). The Assistive Technology (AT) aspect of the model looks at current and future AT and its relationship to the client’s environment. Finally, all these areas are considered within the seven contexts identified within the practice framework. By considering all these factors while evaluating the client’s home environment, the therapist will be able to create an atmosphere wherein the client can safely perform to the full extent of his/her abilities and feel in control.
Instructions for The Environmental Needs Inventory

Collection of Client Data

This inventory considers all aspects of the client’s environment through the process and definitions of the HAAT model (Cook and Hussey, 2002) and the Occupational Therapy Practice Framework Domain and Process (AOTA, 2002). Before the inventory can be taken, the occupational therapist (OT) will review the client’s history and collect the clinical information on the client’s current condition as well as the available information regarding the client’s prognosis. This information will determine to what extent the environment will need to adapt over time. Next, the OT will collaborate with the client, and his/her family when possible, to establish the current support network. A list of possible funding resources will also be discussed with the client and family at this time so as to understand the potential limitations of what can be provided. Finally the client’s preferences toward the modifications will be gathered and documented to assist in the prioritizing process that will follow the inventory.

Performing a Home Accessibility Assessment

A home accessibility assessment will be performed after the client’s information has been documented. The assessment used by the therapist will most likely be dictated by the facility in which the therapist is working. Any extensive accessibility checklist, however, should be sufficient in recognizing potential modifications. After an assessment is done, a list of the potential
modifications should be made. Environmental Modification Protocols are
included in this document in various levels of severity to provide the OT with the
means to document the needed modifications. These protocols are provided in the
section titled *Resources for Identifying and Understanding Accessibility
Modifications*. These levels are based upon the invasiveness and expense of each
modification.

The Assist Guidebook for the Accessible Home (Assist, 2002) is referred
to within this document as a reference manual that addresses the majority of
accessibility issues. This resource is available to anyone, free of charge, by
contacting Assist Inc. by telephone at (801) 355-7085. This resource is provided
solely for the education of the therapist and client, however, and is not meant to
qualify the therapist to make major home modifications without the assistance of
a trained general contractor.

*The Environmental Needs Inventory*

The actual inventory should be completed only after the client’s
information has been collected and an accessibility assessment performed. With
this information, the therapist is prepared to take a comprehensive inventory of
what the client requires from his/her environment. The TENI is designed to
organize all the information previously gathered by the OT into a holistic picture
of the client’s needs. It should be noted that this inventory will have results
unique to each client and environment. The questions provided on the inventory
are simply guidelines that are meant to assist the therapist in addressing all the
clients’ needs. The results of the inventory should in no way be limited to the response of these questions.

Prioritization of Modifications

The results from the inventory will most likely uncover a number of potential modifications that could be made. Realistically, the client may not have the financial means to realize all of the identified modifications. In this case, the OT and the client will counsel together and prioritize the identified modifications so that the issues of safety and functionality are addressed before funding is exhausted. If funds remain after these areas are addressed, than the modifications should continue as they are prioritized.
The Environmental Needs Inventory (TENI)

Date: ____________________

Client’s Name: ____________________

Client’s Diagnosis: ________________________________________________

Client’s current functional levels and predicted long term functional levels
(Taken from medical records)

Client’s current support network:

Client’s funding resources for environmental modifications/technology:

Client’s preferences in regard to environmental modification:
Consider all possible environmental barriers respective to the inventory’s categories and subcategories. Evaluate the environment based on the client’s current and predicted functional levels.

**Note:** The questions located in each section of the inventory are examples to stimulate the evaluation process that is unique to every environment. The results of the inventory should in no way be limited to the response of those questions.

### Human

<table>
<thead>
<tr>
<th><strong>Performance Skills:</strong></th>
<th><strong>Motor Skills:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the environment promote healthy use of all the client’s current skills and abilities?</td>
<td><strong>Posture:</strong></td>
</tr>
<tr>
<td>Does the environment allow for client growth or regression?</td>
<td><strong>Mobility:</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Coordination:</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Strength and Effort:</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Energy:</strong></td>
</tr>
<tr>
<td>Are modifications to the environment required to cater to the cognitive level of the client?</td>
<td><strong>Process Skills:</strong></td>
</tr>
<tr>
<td>Does the environment allow for cognitive growth or regression?</td>
<td><strong>Energy:</strong></td>
</tr>
<tr>
<td>Are there environmental safety issues due to the client’s current or predicted process skills?</td>
<td><strong>Knowledge:</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Temporal Organization</strong></td>
</tr>
<tr>
<td>Is the environment conducive to social interaction?</td>
<td>Organizing Space and Objects:</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td></td>
<td>Adaptation:</td>
</tr>
<tr>
<td></td>
<td>Communication/Interaction Skills:</td>
</tr>
<tr>
<td></td>
<td>Physicality:</td>
</tr>
<tr>
<td></td>
<td>Information Exchange:</td>
</tr>
<tr>
<td></td>
<td>Relations:</td>
</tr>
</tbody>
</table>

**Performance Patterns**

- Does the environment facilitate useful habits?
- Are there barriers that contribute to impoverished habits?
- Are there environmental issues that propagate dominating habits?
- Does the environment allow the client to function optimally in routines and roles?

**Habits:**

- Useful Habits:
- Impoverished Habits:
- Dominating Habits:

**Routines:**

**Roles:**
## Client Factors

Are there environmental safety issues due to the client’s current or predicted mental functions?

Does the environment provide adequate cues for client orientation?

Are there environmental barriers due to sensory impairments?

## Mental Functions:

*Global mental functions:*

*Specific Mental Functions:*

*Sensory Functions and Pain:*

---

## Activity

### Areas of Occupation

*(related to EADLS and Environment)*

Are there barriers within the environment to current and predicted ADLs such as feeding, grooming, personal hygiene, sexual expression, and personal device care?

Are emergency communication needs addressed within the environment?

Are their existing ways for the client to adapt the environment to meet his/her changing interests?

### Activities of Daily Living (ADLs):

*Instrumental Activities of Daily Living (IADLs):*

*Safety Procedures and Emergency Responses:*

*Exploration of Personal Educational Needs or Interests:*

---
Does environmental access to play and leisure pursuits reflect the interests of the client?

<table>
<thead>
<tr>
<th><strong>Play Participation:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Leisure Participation:</td>
</tr>
</tbody>
</table>

### Assistive Technology (AT)

<table>
<thead>
<tr>
<th><strong>Pre-Existing AT</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the environment adequate for the client’s current AT?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Prescribed or Predicted AT</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>What changes to the environment need to be made to accommodate the prescribed and/or predicted AT?</td>
</tr>
</tbody>
</table>
**Contexts**

<table>
<thead>
<tr>
<th>Cultural</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>What steps must be taken to ensure that all changes made to the environment are in accordance to the client’s cultural identity?</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Are there other physical environmental needs not otherwise addressed?</td>
<td></td>
</tr>
<tr>
<td>Are their environmental barriers associated with the location of the client’s home?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Social</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>What existing social networks are available to aid the client perform within his/her environment?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Personal</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the environment consistent to the client’s personality and allow for self expression?</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Spiritual</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the environment allow for spiritual autonomy and development?</td>
<td></td>
</tr>
<tr>
<td><strong>Temporal</strong></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Does the environment reflect the developmental stage of the client and allow for performance accordingly?</td>
<td></td>
</tr>
<tr>
<td>Is the environment able to change with the client?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Virtual</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there accessible technology congruent with the client’s virtual context?</td>
<td></td>
</tr>
</tbody>
</table>
Prioritize Modifications

Take into consideration the client’s safety, functionality, funding options, and support network to prioritize the identified environmental barriers that require modification.
Resources for Identifying and Understanding Accessibility Modifications
**Home Accessibility Protocols**
The protocols below are in order of least invasive/expensive to most invasive/expensive.

**Level 1 Modification**
Any home entrance modified solely with adaptive equipment or minor reorganization to meet the needs of the client. No renovation or addition is necessary.
- Adaptive equipment such as levered door handles, stair rails, traction tape on steps, etc., is used to address minor disability or provide temporary relief of symptoms.
- Removal of clutter and other obstacles would also be a Level 1 Modification.

**Level 2 Modification**
Any home entrance that undergoes simple renovation to meet the needs of the client will be considered a Level 2 Modification.
- Widening of the door frames to 36 inches and adding minor ramps that accommodate a sill or threshold are examples of a Level 2 Modification.
- Refer to The Assist Guidebook for the Accessible Home p. 33.

**Level 3 Modification**
The removal of built in structures at any entrance and/or the addition of a substantial ramp are required for accessibility.
- This may include low rise steps or a ramp for wheelchair access. These modifications usually have substantial space requirements.
- Refer to The Assist Guidebook for the Accessible Home pp.15 and 45.

**Level 4 Modification**
Modifications to any home entrance that involve expensive equipment or materials are required for accessibility. This level of modification can include cement or modular ramps and even mechanical lifts.
- Cement and modular (prefabricated metal) ramps are often more durable, but require more money up front than a typical wooden ramp. Upkeep, however, is often less expensive over time using these materials.
- Mechanical lifts are also very expensive and require constant maintenance. The installation of a mechanical lift will often require extensive renovation or remodeling to the entrance it will serve.
- Refer to The Assist Guidebook for the Accessible Home pp. 44 and 46-47.
**Bathroom Modification Protocols**
The protocols below are in order of least invasive/expensive to most invasive/expensive.

**Level 1 Modification**
The bathroom is modified solely with adaptive equipment or furniture/appliance reorganization to meet the needs of the client. No renovation or appliance removal is necessary.
- Adaptive equipment such as shower benches, grab bars, adapted toilet seats, detachable shower heads, etc., is used to address minor disability or provide temporary relief of symptoms.
- Refer to The Assist Guidebook for the Accessible Home p. 56.

**Level 2 Modification**
The bathroom undergoes simple renovation or appliance removal to meet the needs of the client.
- The removal of the bathtub and installation of a curbed shower is the most common of these modifications, however, raising and lowering the sink or the removal of the vanity for wheelchair access would also apply.
- Refer to The Assist Guidebook for the Accessible Home p. 53

**Level 3 Modification**
The removal of built in structures within the bathroom such as closets and partitions are required for accessibility.
- This may address the need for additional space for wheelchair access or a larger curbed shower but renovation is still limited to the original bathroom space.
- Refer to The Assist Guidebook for the Accessible Home p. 54

**Level 4 Modification**
Space other than what is part of the original bathroom is needed to address the accessibility needs of the client. This level of modification can include wall removal to increase usable floor space and potentially the addition of a roll-in shower.
- Roll in showers (no curb) may involve more extensive modifications in order to place the drain at a sufficient depth to remove the water. This may require the cutting and reinforcing of floor joists which is considered going out of the original bathroom space. This is, however, the most optimal solution for wheelchair bound clients.
- Refer to The Assist Guidebook for the Accessible Home pp. 53-54
**Kitchen Modification Protocols**
The protocols below are in order of least invasive/expensive to most invasive/expensive.

**Level 1 Modification**
The kitchen is modified solely with adaptive equipment or furniture/appliance reorganization to meet the needs of the client. No renovation or appliance removal is necessary.
- Organization of tables, chairs, bar stools etc., will be considered along with adaptive equipment like reaching devices and non-skid surfaces.

**Level 2 Modification**
The kitchen undergoes simple renovation or appliances are removed/changed to meet the needs of the client.
- Adaptations made to cabinetry such as roll-out shelves, pull-out work surfaces, and toe space would be examples of this level of modifications unless the entire kitchen cabinetry was replaced or removed (in which case the modifications would be level Replacing an old stove for one that has front mounted controls, or perhaps a roll-under cooking surface would be an example of a Level 2 modification.
- Refer to The Assist Guidebook for the Accessible Home pp. 60-61.

**Level 3 Modification**
The removal/renovation of built in structures or the extensive addition of assistive technology are required for accessibility and functionality within the kitchen.
- The addition of height adjustable counter space or the removal of pantries, islands, and bars would be examples of what is considered a level 3 modification.

**Level 4 Modification**
Space other than what is part of the original kitchen is needed to address the accessibility and functionality needs of the client.
- This level of modification can include wall removal to increase usable floor space and potentially the addition to the current house’s frame to increase overall kitchen size.
- Refer to The Assist Guidebook for the Accessible Home pp. 66-67.
Interdisciplinary Network Development

The local city government will be the OT’s best resource in developing a network of disciplines specializing in general contracting. For professionals in this field to practice legally, they must have national certifications and pass local requirements as well. Professionals that have met these requirements are referred to as licensed and bonded. The Building and Zoning Administration is the office that will be able to supply a list of all licensed and bonded professionals within the city and outlying communities.

If the client does not already have a preference of contractors, the therapist can contact one of the individuals on the list. The therapist will need to document the names and contact information of the contractors that are contacted so as to lay the foundation for professional interdisciplinary relationships.

The local Building and Zoning Administration will also be able to provide blueprints upon request from the property owner. It is important to note that the properties being modified will not always belong to the client. In this case, the owner of the property must be contacted before any modifications are made. It is also important to note that if the client does not own the property, he/she cannot request blueprints from the Building and Zoning Administration. The owner of the property must provide proof of ownership and permission before blueprints can be accessed or modifications can be made.
**General Contracting and Accessibility Terminology**

Taken from the International Code Counsel’s 2003 International Residential Code (pp. 9-21)

ACCESSIBLE. Signifies access that requires the removal of an access panel or similar removable obstruction.

ACCESSIBLE, READILY. Signifies access without the necessity for removing a panel or similar obstruction.

ADDITION. An extension or increase in floor area or height of a building or structure.

AIR-CONDITIONING SYSTEM. A system that consists of heat exchangers, blowers, filters, supply, exhaust and return-air systems, and shall include any apparatus installed in connection therewith.

ALTERATION. Any construction or renovation to an existing structure other than repair or addition that requires a permit. Also, a change in a mechanical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit.

ANCHORS. See “Supports.”

APPLIANCE. A device or apparatus that is manufactured and designed to utilize energy and for which this code provides specific requirements.

APPROVED. Approved refers to approval by the building official as the result of investigation and tests conducted by him or her, or by reason of accepted principles or tests by nationally recognized organizations.

APPROVED AGENCY. An established and recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved by the building official.

ATTIC. The unfinished space between the ceiling joists of the top story and the roof rafters.

BALCONY, EXTERIOR. An exterior floor projecting from and supported by a structure without additional independent supports.

BASEMENT. That portion of a building that is partly or completely below grade (see “Story above grade”).

BASEMENT WALL. The opaque portion of a wall that encloses one side of a basement and has an average below grade wall area that is 50 percent or more of the total opaque and non-opaque area of that enclosing side.

BATHROOM GROUP. A group of fixtures, including or excluding a bidet, consisting of a water closet, lavatory, and bathtub or shower. Such fixtures are located together on the same floor level.

BOILER. A self-contained appliance from which hot water is circulated for heating purposes and then returned to the boiler, and which operates at water pressures not exceeding 160 pounds per square inch gage (psig) (1102 kPa gage) and at water temperatures not exceeding 2500 F (1210 C).

BOND BEAM. A horizontal grouted element within masonry in which reinforcement is embedded.

BRACED WALL LINE. A series of braced wall panels in a single story constructed in accordance with Section R602.10 for wood framing or Section R603.7 or R301.1.1 for cold-formed steel framing to resist racking from seismic and wind forces.

BUILDING. Building shall mean any one- and two-family dwelling or portion thereof, including townhouses, that is used, or designed or intended to be used for human habitation, for living, sleeping, cooking or eating purposes, or any combination thereof, and shall include accessory structures thereto.
BUILDING DRAIN. The lowest piping that collects the discharge from all other drainage piping inside the house and extends 30 inches (762 mm) in developed length of pipe, beyond the exterior walls and conveys the drainage to the building sewer.

BUILDING, EXISTING. Existing building is a building erected prior to the adoption of this code, or one for which a legal building permit has been issued.

BUILDING LINE. The line established by law, beyond which a building shall not extend, except as specifically provided by law.

BUILDING OFFICIAL. The officer or other designated authority charged with the administration and enforcement of this code.

BUILDING SEWER. That part of the drainage system that extends from the end of the building drain and conveys its discharge to a public sewer, private sewer, individual sewage-disposal system or other point of disposal.

BUILDING THERMAL ENVELOPE. The basement walls, exterior walls, floor, roof and any other building element that enclose conditioned spaces.

CEILING HEIGHT. The clear vertical distance from the finished floor to the finished ceiling.

CHIMNEY. A primary vertical structure containing one or more flues, for the purpose of carrying gaseous products of combustion and air from a fuel-burning appliance to the outside atmosphere.

CLADDING. The exterior materials that cover the surface of the building envelope that is directly loaded by the wind.

CLOSEST. A small room or chamber used for storage.

CONDITIONED AIR. Air treated to control its temperature, relative humidity or quality.

CONDITIONED AREA. That area within a building provided with heating and/or cooling systems or appliances capable of maintaining, through design or heat loss/gain, 680 F (200 C) during the heating season and/or 800 F (270 C) during the cooling season, or has a fixed opening directly adjacent to a conditioned area.

CONDITIONED FLOOR AREA. The horizontal projection of the floors associated with the conditioned space.

CONFINED SPACE. A room or space having a volume less than 50 cubic feet per 1,000 Btu/h (4.83 L/W) of the aggregate input rating of all fuel-burning appliances installed in that space.

CONSTRUCTION DOCUMENTS. Written, graphic and pictorial documents prepared or assembled for describing the design, location and physical characteristics of the elements of a project necessary for obtaining a building permit. Construction drawings shall be drawn to an appropriate scale.

CORROSION RESISTANCE. The ability of a material to withstand deterioration of its surface or its properties when exposed to its environment.

COURT. A space, open and unobstructed to the sky, located at or above grade level on a lot and bounded on three or more sides by walls or a building.

DEAD LOADS. The weight of all materials of construction incorporated into the building, including but not limited to walls, floors, roofs, ceilings, stairways, built-in partitions, finishes, cladding, and other similarly incorporated architectural and structural items, and fixed service equipment.

DECK. An exterior floor system supported on at least two opposing sides by an adjoining structure and/or posts, piers, or other independent supports.

DECORATIVE GLASS. A carved, leaded or Dalle glass or glazing material whose purpose is decorative or artistic, not functional; whose coloring, texture or other design qualities or components cannot be removed without destroying the glazing
material; and whose surface, or assembly into which it is incorporated, is divided into segments.

DRAFT STOP. A material, device or construction installed to restrict the movement of air within open spaces of concealed areas of building components such as crawl spaces, floor-ceiling assemblies, roof-ceiling assemblies and attics.

DRAIN. Any pipe that carries soil and water-borne wastes in a building drainage system.

DUCT SYSTEM. A continuous passageway for the transmission of air which, in addition to ducts, includes duct fittings, dampers, plenums, fans and accessory air-handling equipment and appliances.

DWELLING. Any building that contains one or two dwelling units used, intended, or designed to be built, used, rented, leased, let or hired out to be occupied, or that are occupied for living purposes.

DWELLING UNIT. A single unit providing complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.

EMERGENCY ESCAPE AND RESCUE OPENING. An operable window, door or similar device that provides for a means of escape and access for rescue in the event of an emergency.

EQUIPMENT. All piping, ducts, vents, control devices and other components of systems other than appliances that are permanently installed and integrated to provide control of environmental conditions for buildings. This definition shall also include other systems specifically regulated in this code.

EXISTING INSTALLATIONS. Any plumbing system regulated by this code that was legally installed prior to the effective date of this code, or for which a permit to install has been issued.

EXTERIOR INSULATION FINISH SYSTEMS (EIFS). Synthetic stucco cladding systems typically consisting of five layers: adhesive, insulation board, base coat into which fiberglass reinforcing mesh is embedded, and a finish coat in the desired color.

EXTERIOR WALL. An above-grade wall enclosing conditioned space. Includes between floor spandrels, peripheral edges of floors, roof and basement knee walls, dormer walls, gable end walls, walls enclosing a mansard roof, and basement walls with an average below grade wall area that is less than 50 percent of the total opaque and non-opaque area of that enclosing side.

FACTORY-BUILT CHIMNEY. A listed and labeled chimney composed of factory-made components assembled in the field in accordance with the manufacturer’s instructions and the conditions of the listing.

FENESTRATION. Skylights, roof windows, vertical windows (whether fixed or moveable); opaque doors; glazed doors; glass block; and combination opaque/glazed doors.

FIREBLOCKING. Building materials installed to resist the free passage of flame to other areas of the building through concealed spaces.

FIREPLACE. An assembly consisting of a hearth and fire chamber of noncombustible material and provided with a chimney, for use with solid fuels.

FIXTURE. See “Plumbing fixture.”

FLOOD-LEVEL RIM. The edge of the receptor or fixture from which water overflows.

FLOOR DRAIN. A plumbing fixture for recess in the floor having a floor-level strainer intended for the purpose of the collection and disposal of waste water used in cleaning the floor and for the collection and disposal of accidental spillage to the floor.
FLUE. See “Vent.”

FOAM PLASTIC INSULATION. A plastic that is intentionally expanded by the use of a foaming agent to produce a reduced-density plastic consisting open or closed cells distributed throughout the plastic and that has a density less than 20 pounds per cubic foot.

FURNACE. A vented heating appliance designed or arranged to discharge heated air into a conditioned space or through a duct or ducts.

GRADE. The finished ground level adjoining the building at all exterior walls.

GRADE FLOOR OPENING. A window or other opening located such that the sill height of the opening is not more than 44 inches (1118 mm) above or below the finished ground level adjacent to the opening.

GUARD. A building component or a system of building components located near the open sides of elevated walking surfaces that minimizes the possibility of a fall from the walking surface to the lower level.

HABITABLE SPACE. A space in a building for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered habitable spaces.

HANDRAIL. A horizontal or sloping rail intended for grasping by the hand for guidance or support.

HAZARDOUS LOCATION. Any location considered to be a fire hazard for flammable vapors, dust, combustible fibers or other highly combustible substances.

HEAT PUMP. An appliance having heating or heating/cooling capability and that uses refrigerants to extract heat from air, liquid or other sources.

HEIGHT, BUILDING. The vertical distance from grade plane to the average height of the highest roof surface.

HEIGHT, STORY. The vertical distance from top to top of two successive tiers of beams or finished floor surfaces; and, for the topmost story, from the top of the floor finish to the top of the ceiling joists or, where there is not a ceiling, to the top of the roof rafters.

HURRICANE-PRONE REGIONS. Areas vulnerable to hurricanes, defined as the U.S. Atlantic Ocean and Gulf of Mexico coasts where the basic wind speed is greater than 110 miles per hour (177 km/h), and Hawaii, Puerto Rico, Guam, Virgin Islands, and America Samoa.

IGNITION SOURCE. A flame, spark or hot surface capable of igniting flammable vapors or fumes. Such sources include appliance burners, burner ignitions and electrical switching devices.

INDIVIDUAL SEWAGE DISPOSAL SYSTEM. A system for disposal of sewage by means of a septic tank or mechanical treatment, designed for use apart from a public sewer to serve a single establishment or building.

INDIVIDUAL WATER SUPPLY. A supply other than an approved public water supply that serves one or more families.

INSULATING CONCRETE FORM (LCF). A concrete forming system using stay-in-place forms of rigid foam plastic insulation, a hybrid of cement and foam insulation, a hybrid of cement and wood chips, or other insulating material for constructing cast-in-place concrete walls.

JURISDICTION. The governmental unit that has adopted this code under due legislative authority.

KITCHEN. Kitchen shall mean an area used, or designated to be used, for the preparation of food.

LABEL. An identification applied on a product by the manufacturer which contains the name of the manufacturer, the function and performance characteristics of the product or material, and the name and identification of an approved agency and that indicates that the representative sample of the product or material has been tested.
and evaluated by an approved agency. (See also “Manufacturer’s designation” and “Mark.”)

LABELED. Devices, equipment or materials to which have been affixed a label, seal, symbol or other identifying mark of a testing laboratory, inspection agency or other organization concerned with product evaluation that maintains periodic inspection of the production of the above labeled items that attests to compliance with a specific standard.

LIGHT-FRAMED CONSTRUCTION. A type of construction whose vertical and horizontal structural elements are primarily formed by a system of repetitive wood or light gage steel framing members.

LIVE LOADS. Those loads produced by the use and occupancy of the building or other structure and do not include construction or environmental loads such as wind load, snow load, rain load, earthquake load, flood load or dead load.

LIVING SPACE. Space within a dwelling unit utilized for living, sleeping, eating, cooking, bathing, washing and sanitation purposes.

LOT. A portion or parcel of land considered as a unit.

LOT LINE. A line dividing one lot from another, or from a street or any public place.

MAIN. The principal pipe artery to which branches may be connected.

MANUFACTURED HOME. Manufactured home means a structure, transportable in one or more sections, which in the traveling mode is 8 body feet (2438 body mm) or more in width or 40 body feet (12 192 body mm) or more in length, or, when erected on site, is 320 square feet or more, and which is built on a permanent chassis and designed to be used as a dwelling with or without a permanent foundation when connected to the required utilities, and includes the plumbing, heating, air-conditioning and electrical systems contained therein; except that such term shall include any structure that meets all the requirements of this paragraph except the size requirements and with respect to which the manufacturer voluntarily files a certification required by the secretary (HUD) and complies with the standards established under this title. For mobile homes built prior to June 15, 1976, a label certifying compliance to the Standard for Mobile Homes, N7FPA 501, in effect at the time of manufacture is required. For the purpose of these provisions, a mobile home shall be considered a manufactured home.

MARK. An identification applied on a product by the manufacturer indicating the name of the manufacturer and the function of a product or material.

MASONRY CHIMNEY. A field-constructed chimney composed of solid masonry units, bricks, stones or concrete.

METAL ROOF PANEL. An interlocking metal sheet having a minimum installed weather exposure of at least 3 square feet per sheet.

METAL ROOF SHINGLE. An interlocking metal sheet having an installed weather exposure less than 3 square feet per sheet.

MEZZANINE, LOFT. An intermediate level or levels between the floor and ceiling of any story with an aggregate floor area of not more than one-third of the area of the room or space in which the level or levels are located.

MULTIPLE STATION SMOKE ALARM. Two or more single station alarm devices that are capable of interconnection such that actuation of one causes all integral or separate audible alarms to operate.

NONCONDITIONED SPACE. A space that is not a conditioned space by insulated walls, floors or ceilings.

OCCUPIED SPACE. The total area of all buildings or structures on any lot or parcel of ground projected on a horizontal plane, excluding permitted projections as allowed by this code.

OWNER. Any person, agent, firm or corporation having a legal or equitable interest in the property.
PERMIT. An official document or certificate issued by the authority having jurisdiction that authorizes performance of a specified activity.

PITCH. See “Slope.”

PLATFORM CONSTRUCTION. A method of construction by which floor framing bears on load bearing walls that are not continuous through the story levels or floor framing.

PLUMBING APPLIANCE. An energized household appliance with plumbing connections, such as a dishwasher, food-waste grinder, clothes washer or water heater.

POLLUTION. An impairment of the quality of the potable water to a degree that does not create a hazard to the public health but that does adversely and unreasonably affect the aesthetic qualities of such potable water for domestic use.

PORTABLE FUEL CELL APPLIANCE. A fuel cell generator of electricity, which is not fixed in place. A portable fuel cell appliance utilizes a cord and plug connection to a grid-isolated load and has an integral fuel supply.

POSITIVE ROOF DRAINAGE. The drainage condition in which consideration has been made for all loading deflections of the roof deck, and additional slope has been provided to ensure drainage of the roof within 48 hours of precipitation.

POTABLE WATER. Water free from impurities present in amounts sufficient to cause disease or harmful physiological effects and conforming in bacteriological and chemical quality to the requirements of the public health authority having jurisdiction.

PUBLIC SEWER. A common sewer directly controlled by public authority.

PUBLIC WATER MAIN. A water-supply pipe for public use controlled by public authority.

PUBLIC WAY. Any street, alley or other parcel of land open to the outside air leading to a public street, which has been deeded, dedicated or otherwise permanently appropriated to the public for public use and that has a clear width and height of not less than 10 feet (3048 mm).

PURGE. To clear of air, gas or other foreign substances.

RAMP. A walking surface that has a running slope steeper than 1 unit vertical in 20 units horizontal (5-percent slope).

REFRIGERANT. A substance used to produce refrigeration by its expansion or evaporation.

REFRIGERATING SYSTEM. A combination of interconnected parts forming a closed circuit in which refrigerant is circulated for the purpose of extracting, then rejecting, heat. A direct refrigerating system is one in which the evaporator or condenser of the refrigerating system is in direct contact with the air or other substances to be cooled or heated. An indirect refrigerating system is one in which a secondary coolant cooled or heated by the refrigerating system is circulated to the air or other substance to be cooled or heated.

REGISTERED DESIGN PROFESSIONAL. An individual who is registered or licensed to practice their respective design profession as defined by the statutory requirements of the professional registration laws of the state or jurisdiction in which the project is to be constructed.

REPAIR. The reconstruction or renewal of any part of an existing building for the purpose of its maintenance.

[B] REROOFING~ The process of recovering or replacing an existing roof covering. See “Roof recover.”

RESIDENTIAL BUILDING TYPE. The type of residential building for determining building thermal envelope criteria. Detached one- and two-family dwellings are Type A-1. Townhouses are Type A-2.

RETURN AIR. Air removed from an approved conditioned space or location and recirculated or exhausted.
RISER. A water pipe that extends vertically one full story or more to convey water to branches or to a group of fixtures.

ROOF ASSEMBLY. A system designed to provide weather protection and resistance to design loads. The system consists of a roof covering and roof deck or a single component serving as both the roof covering and the roof deck. A roof assembly includes the roof deck, vapor retardant, substrate or thermal barrier, insulation, vapor retardant, and roof covering.

ROOF COVERING. The covering applied to the roof deck for weather resistance, fire classification or appearance.

ROOF COVERING SYSTEM. See “Roof assembly.”

ROOF DECK. The flat or sloped surface not including its supporting members or vertical supports.

ROOF RECOVER. The process of installing an additional roof covering over a prepared existing roof covering without removing the existing roof covering.

ROOF REPAIR. Reconstruction or renewal of any part of an existing roof for the purposes of its maintenance.

ROOFTOP STRUCTURE. An enclosed structure on or above the roof of any part of a building.

RUNNING BOND. The placement of masonry units such that head joints in successive courses are horizontally offset at least one-quarter the unit length.

SANITARY SEWER. A sewer that carries sewage and excludes storm, surface and groundwater.

SCUPPER. An opening in a wall or parapet that allows water to drain from a roof.

SEISMIC DESIGN CATEGORY. A classification assigned to a structure based on its Seismic Group and the severity of the design earthquake ground motion at the site.

SEPTIC TANK. A water-tight receptor that receives the discharge of a building sanitary drainage system and is constructed so as to separate solids from the liquid, digest organic matter through a period of detention, and allow the liquids to discharge into the soil outside of the tank through a system of open joint or perforated piping or a seepage pit.

SEWAGE. Any liquid waste containing animal matter, vegetable matter or other impurity in suspension or solution.

SEWAGE PUMP. A permanently installed mechanical device for removing sewage or liquid waste from a sump.

SHEAR WALL. A general term for walls that are designed and constructed to resist racking from seismic and wind by use of masonry, concrete, cold-formed steel or wood framing in accordance with Chapter 6 of this code and the associated limitations in Section R30i.2 of this code.

SIDE VENT. A vent connecting to the drain pipe through a fitting at an angle less than 45 degrees (0.79 rad) to the horizontal.

SINGLE PLY MEMBRANE. A roofing membrane that is field applied using one layer of membrane material (either homogeneous or composite) rather than multiple layers.

SINGLE STATION SMOKE ALARM. An assembly incorporating the detector, control equipment and alarm sounding device in one unit that is operated from a power supply either in the unit or obtained at the point of installation.

SLIP JOINT. A mechanical-type joint used primarily on fixture traps. The joint tightness is obtained by compressing a friction-type washer such as rubber, nylon, neoprene, lead or special packing material against the pipe by the tightening of a (slip) nut.

SLOPE. The fall (pitch) of a line of pipe in reference to a horizontal plane. In drainage, the slope is expressed as the fall in units vertical per units horizontal (percent) for a length of pipe.
SOIL STACK OR PIPE. A pipe that conveys sewage containing fecal material.

STANDARD TRUSS. Any construction that does not permit the roof/ceiling insulation to achieve the required R-value over the exterior walls.

STORM SEWER. DRAIN. A pipe used for conveying rain water, surface water, subsurface water and similar liquid waste.

STORY. That portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above.

STORY ABOVE GRADE. Any story having its finished floor surface entirely above grade, except that a basement shall be considered as a story above grade where the finished surface of the floor above the basement is:
1. More than 6 feet (1829 mm) above grade plane.
2. More than 6 feet (1829 mm) above the finished ground level for more than 50 percent of the total building perimeter.
3. More than 12 feet (3658 mm) above the finished ground level at any point.

STRUCTURE. That which is built or constructed.

SUMP. A tank or pit that receives sewage or waste, located below the normal grade of the gravity system and that must be emptied by mechanical means.

SUMP PUMP. A pump installed to empty a sump. These pumps are used for removing storm water only. The pump is selected for the specific head and volume of the load and is usually operated by level controllers.

SUNROOM ADDITION. A one-story structure added to an existing dwelling with a glazing area in excess of 40 percent of the gross area of the structure’s exterior walls and roof.

SUPPLY AIR. Air delivered to a conditioned space through ducts or plenums from the heat exchanger of a heating, cooling or ventilating system.

SUPPORTS. Devices for supporting, hanging and securing pipes, fixtures and equipment.

TOWNHOUSE. A single-family dwelling unit constructed in a group of three or more attached units in which each unit extends from foundation to roof and with open space on at least two sides.

TRIM. Picture molds, chair rails, baseboards, handrails, door and window frames, and similar decorative or protective materials used in fixed applications.

VENT. A passageway for conveying flue gases from fuel-fired appliances, or their vent connectors, to the outside atmosphere.

VENTILATION. The natural or mechanical process of supplying conditioned or unconditioned air to, or removing such air from, any space.

VENTING. Removal of combustion products to the outdoors.

VENTING SYSTEM. A continuous open passageway from the flue collar of an appliance to the outside atmosphere for the purpose of removing flue or vent gases. A venting system is usually composed of a vent or a chimney and vent connector, if used, assembled to form the open passageway.

WALLS. Walls shall be defined as follows:
Load-bearing wall is a wall supporting any vertical load in addition to its own weight.
Nonbearing wall is a wall which does not support vertical loads other than its own weight.

WASTE. Liquid-borne waste that is free of fecal matter.

WASTE PIPE OR STACK. Piping that conveys only liquid sewage not containing fecal material.

WATER-DISTRIBUTION SYSTEM. Piping which conveys water from the
service to the plumbing fixtures, appliances, appurtenances, equipment, devices or other systems served, including fittings and control valves.

WATER HEATER. Any heating appliance or equipment that heats potable water and supplies such water to the potable hot water distribution system.

WATER MAIN. A water-supply pipe for public use.

WATER OUTLET. A valved discharge opening, including a hose bibb, through which water is removed from the potable water system supplying water to a plumbing fixture or plumbing appliance that requires either an air gap or backflow prevention device for protection of the supply system.

WOOD STRUCTURAL PANEL. A panel manufactured from veneers; or wood strands or wafers; bonded together with waterproof synthetic resins or other suitable bonding systems. Examples of wood structural panels are plywood, OSB or composite panels.

YARD. An open space, other than a court, unobstructed from the ground to the sky, except where specifically provided by this code, on the lot on which a building is situated.
References


CHAPTER V
SUMMARY

Occupational Therapy (OT) is a discipline that is trained to look beyond the dysfunction and see the client’s complex and multifaceted life. OTs know what to assess in order to identify what limitations are impeding the client’s overall capability to perform. Sevigny (2000) points out that there are five aspects of the client that are looked at when an OT does an assessment: environment, cognition, sensory, physiological/neuromuscular, and psychological (pp. 12). Every concern that emerges will fall within one of these areas, all of which are covered by the OT’s evaluation. This ability to see the global picture qualifies OT to assess home environments and suggest changes to promote function. This document gives OTs the necessary tools to guide them through an evaluation process that will help them mold an environment to fit the needs of the client. Environmental modifications within the homes of persons with disabilities ensure safe and productive atmospheres in which the clients can function.

The client’s ability to interact with any given environment will ultimately determine the success experienced therein. For this reason, it is recommended other systems are developed that focus on employment environments, educational environments, and recreational environments that are outside the home. Though many of these public areas will have already addressed the accessibility issues, the OT will be able to determine what other changes are necessary within these environments to make them functional.
It is also recommended that a system be developed that would more efficiently address the issues of interdisciplinary networking. For this document to work properly, the OT will have to develop an interdisciplinary team that incorporates the expertise of contractors, architects, plumbers and electricians. Each environment will require a different team of specialists, but there will always be the same task of bringing them together. Expectations of safety and productivity cannot be realized in environments that do not consider all aspects of the client’s life.
References


