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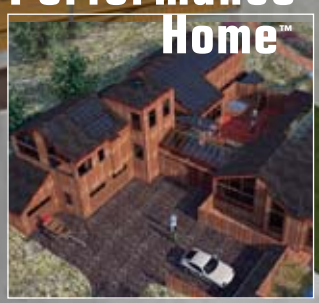

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Universal Design Living Laboratory

Rosemarie Rossetti

(Figure 1) Authoi doing a load of laundry

My Story

When my husband, Mark Leder, and I got married on June 10, 1995, our dream home in Gahanna, Ohio was under construction. We moved into the home in October 1995 and fully intended to live there the rest of our lives.

When we worked with our builder, we asked the salesperson to put in a few wider doors in the master bedroom and bathroom to accommodate wheelchairs should our visiting parents need them for mobility as they got older. We also had lever handles put on all the doors to make them easier to open. We were thinking ahead to our future and selected a two-story floor plan with the master bedroom suite on the first floor; to make the home more accessible should one of us not be able to climb stairs.

We hadn't counted on a sudden tragedy on June 13, 1998, while we were celebrating our wedding anniversary.

We had gone for a bicycle ride on a rural bike trail in Granville, Ohio. After riding for a few minutes, Mark thought he heard a gun shot and slowed down to investigate. As he scanned the scene he saw a large tree falling. He shouted "Stop!!!" but the warning was too late. Instantly, I was crushed by a three-and-one-half-ton tree and paralyzed from the waist down.

synopsis

Universal design is human-centered design, accommodating people of all sizes, ages, and abilities.

The seven principles of universal design are: equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical effort, and size and space for approach and use.

Traditional Home Design Problems

After six weeks in the hospital, I returned home with a different set of lenses—those of a person with a disability. Our

"Universal design is a framework for the design of living and working spaces and products benefiting the widest possible range of people in the widest range of situations without special or separate design."

(Figure 2) Author at base of staircase in current home

traditionally designed home had many problems, the first of which were the steps—at all four entrances.

The temporary ramp to the front entrance that my husband, family, and neighbors built to push me in my wheelchair to get me into my home was very steep. The carpeting in my home was hard for me to roll on. Life in a wheelchair is hard enough. Living in my own home was a monumental task!

Doors had to be removed so I could enter the laundry room, bathroom area, and shower. Privacy was lost! Cramped quarters in the laundry room made me angry as I banged up the washer, dryer, and walls with my wheelchair. I use a top-loading washer and have to use a reacher—a stick with grabbers on the end—to pull out every single item. It takes forever to do a load of laundry.

Mark and I operate our separate businesses out of our home. Half of our house is "off-limits" to me due to the steps to the basement and steps to the second floor, which contain his office and our guest bedroom and bathroom.

Accessibility is a problem for me because as I sit in my wheelchair, I am four-feet, two-inches tall. Mark, in contrast, is six-foot-four. Due to my limited reach, my independence is compromised.

The kitchen is not designed to be wheelchair-friendly. Wall cabinets are too high, so I can only reach items on the bottom shelves. The 36-inch-high countertop is not at a level that is comfortable as I prepare meals. The light switches and electric outlets on the back wall are out of reach. The freezer section of my refrigerator is on top and not easy to reach. I strain to do dishes since there is no knee space under the sink, forcing me to approach the sink sideways. I use a reacher to get things out of the pantry. There is no space for my knees under the range, and I can't see inside large pots since the cooktop is at 36 inches high. The bottom-hinged oven is under the range and is not easy or safe for me to use because the door is in my way when it is open. The microwave is above the range and totally out of my reach.

The bathroom design also makes life difficult. There is no knee space under the sink, so I have to use the sink seated sideways. We have a portable shower bench in the shower that must be removed every time Mark takes a shower, and put back when it is my turn. Mark installed a hand-held shower nozzle for me to use at a lower height, while he positions it above his head when he showers. It is very difficult for me to transfer from my wheelchair to the whirlpool due to the height of the tub and lack of grab bars in this area.

In the past eight years, I have learned to cope with many changes, challenges, and inconveniences in my life. I have also been researching universal design, a housing solution that will lead to my future independence, accessibility, comfort, and safety.

(Figure 3) Author opening oven

(Figure 4) Shower stall showing bench

Universal Design Living Laboratory

Universal design is a framework for the design of living and working spaces and products benefiting the widest possible range of people in the widest range of situations without special or separate design. Universal design is human-centered design, accommodating people of all sizes, ages, and abilities.

There are seven principles of universal design. They were introduced previously by Wolfgang Preiser in, Issue 1, January/February 2006 of *Ultimate Home Design* in "Universal Design: Paradigm For The 21st Century."

Principle One: Equitable Use

- The design is useful and marketable to people with diverse abilities.
- Provide the same means of use for all users: identical whenever possible, equivalent when not.
- Avoid segregating or stigmatizing any users.
- Provisions for privacy, security, and safety should be equally available to all users.
- Make the design appealing to all users.

Principle Two: Flexibility In Use

- The design accommodates a wide range of individual preferences and abilities.
- Provide choice in methods of use.
- Accommodate right- or left-handed access and use.
- Facilitate the user's accuracy and precision.
- Provide adaptability to the user's pace.

Principle Three: Simple And Intuitive Use

- Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.
- Eliminate unnecessary complexity.
- Be consistent with user expectations and intuition.
- Accommodate a wide range of literacy and language skills.
- Arrange information consistent with its importance. Provide effective prompting and feedback during and after task completion.

Principle Four: Perceptible Information

- The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

• Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.

• Provide adequate contrast between essential information and its surroundings. Maximize "legibility" of essential information.

• Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).

• Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

(Figure 5) Front elevation UDLL

Principle Five: Tolerance For Error

• The design minimizes hazards and the adverse consequences of accidental or unintended actions.

• Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.

• Provide warnings of hazards and errors.

• Provide fail-safe features.

• Discourage unconscious action in tasks that require vigilance.

Principle Six: Low Physical Effort

• The design can be used efficiently and comfortably and with a minimum of fatigue.

• Allow user to maintain a neutral body position.

• Use reasonable operating forces.

• Minimize repetitive actions.

• Minimize sustained physical effort.

Principle Seven: Size And Space For Approach And Use

• Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

• Provide a clear line of sight to important elements for any seated or standing user. Make reach to all components comfortable for any seated or standing user.

• Accommodate variations in hand and grip size.

• Provide adequate space for the use of assistive devices or personal assistance.

Mark and I are planning to build our next dream home and know much more than we did in 1995 when we built our current home. This home is more likely to serve us as we grow old. The house, the Universal Design Living Laboratory (www.UDLL.com), will serve as a national model to bring about awareness of universal design to the public and the building, remodeling, architectural, and design industries.

This UDLL will serve to help people better understand how to create a more comfortable living environment that will enhance their quality of life. The UDLL will serve as a resource for others to learn from—today and tomorrow.

An approximately 3,500-square-foot ranch-style home, presently in the final phase of design, is to be built in the Columbus, Ohio Metropolitan Area. Construction is anticipated to begin in the fall of 2006 and end in the summer of 2007. The home incorporates unobtrusive universal design, resource- and energy-efficient green building methods, advanced automation technology, a healthy home construction approach, and the design principles of feng shui. The finest craftsmanship and state-of-the-art products and services will be incorporated. The gardens will also incorporate universal design principles, allowing me the ability to garden again, and use my skills and knowledge as a horticulturist.

Mark and I will each have a private home office, as well as one for my office assistant. We desire an easy-to-maintain residence with ample space for working, entertaining, and housing extended-stay family or guests.

Selecting A Builder

Building a custom home is a daunting task. Building a home that accommodates me as well as my husband, and includes three home offices, adds additional layers of complexity.

We started the process by identifying locations where we wanted to live. Then we went to model homes of builders in those areas. Of course, most of the time Mark got to tour the model homes while I sat in the converted-garage sales offices, since the homes were not wheelchair accessible. We settled on a housing development and selected CV Perry as the builder.

(Figure 6) Builder and architect group

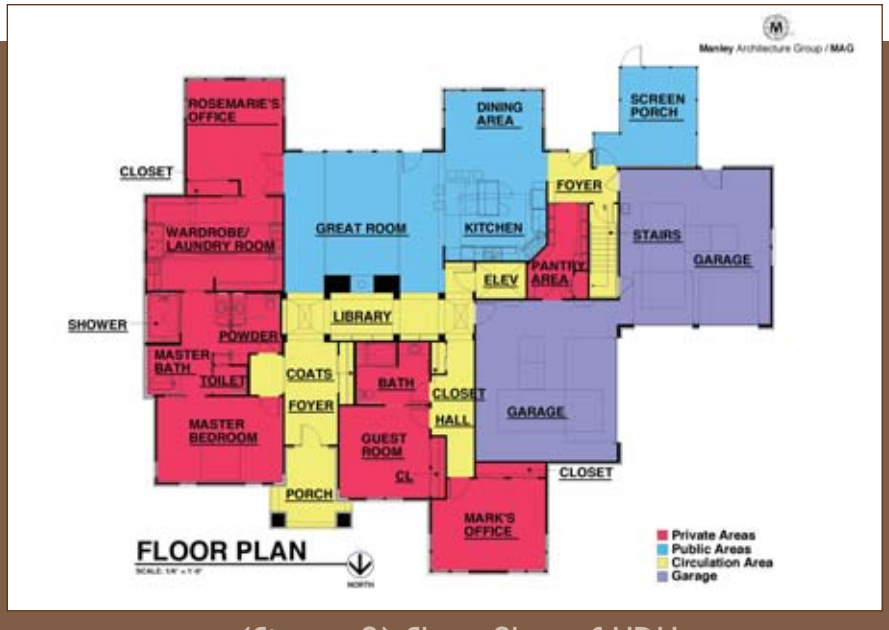
(Figure 7) Author with architect and assistant

We looked at his one-story ranch floor plan and tried to modify the room positions and sizes to accommodate our needs; this was not successful. It was time to hire an architect.

The Design Process

After many architects were referred to us, we scheduled interviews and contacted their referrals. Based on previous experience building custom homes and ADA-compliant commercial architecture projects, we selected Patrick Manley in Columbus.

As we worked with him, we first tried to "shoehorn" our ideas for the floor plan into CV Perry's floor plan and realized that this process was not working. Truly, we needed to design this house from scratch. We took the approach of designing the home from the "inside out." This involved designing the layout for each of the rooms on the floor plan first and then designing the exterior of the home. This strategy worked well. We took measurements of our existing rooms and positioned the rooms on the floor plan to best accommodate our need for sound and sight privacy as well as looking at how the space was to be used. We drew in existing as well as new furniture on the floor plan. Manley drew five-foot circles throughout the floor plan in order to show the turning diameter of my wheelchair. Doors were drawn in at 36 inches and hallways at 48 inches wide. We also examined pathways of travel to look at circulation patterns. This will be especially important as we bring in groceries from the garage and store them in the roll-through pantry.



(Figure 8) Floor Plan of UDLL

We also looked at how space could be used for multiple functions, as well as the point where items or equipment would be used. This point-of-use mindset helped us to determine our need for space. We found that the laundry area would better serve us if it were incorporated in the master closet area. Manley also designed one of the hallways to serve double use, by utilizing the wall to serve as our library. The

kitchen center island will serve as a work station for multiple cooks and also can be used as an informal dining area. Space was also saved by positioning the half bath adjoined with the master bath, with a pocket door between the two rooms. This powder room will serve my needs for a lower height vanity. Ever mindful of the total square footage of the house, we continued to monitor this closely to keep construction costs in budget.

As we continued to design the kitchen and bath areas, we realized that an expert was needed. I contacted Mary Jo Peterson in Brookfield, Connecticut, and she agreed to take on our project. She worked closely with all of us to carefully present options that would accommodate Mark and me. She analyzed all of our reach specifications and carefully thought out the sequence of events that I go through to store, prepare, cook, and serve food, as well as clean up after meals.

Reflections

Now that we have been in the design process with Manley for a year and a half and Mary Jo Peterson for one year, we feel that our decisions on space planning were carefully considered. The time spent will make the home more useable, accessible, and aesthetically beautiful. Construction dollars will be saved due to our constant vigilance of the total square footage. The architectural drawings will serve the builder and his contractors well as they create this one-of-a-kind prototype, which is expected to be replicated in whole or part, throughout the country. **UHD**

The Author

Rosemarie Rossetti, Ph.D., is building a national model universal design home in metropolitan Columbus, Ohio. She is an internationally known speaker, trainer, consultant, and writer. To contact Rosemarie, learn about her speaking services, or subscribe to receive her free monthly articles, go to: www.RosemarieSpeaks.com. To learn more about the Universal Design Living Laboratory, go to: www.UDLL.com.