

VISITABILITY AND UNIVERSAL DESIGN APPLICATIONS



What is Universal Design?



Image source: ai-media.tv

Universal Design (UD) is the concept that a building or space may be developed and designed in such a way that it is accessible to a wide range of people.

[According to U.S. Census Bureau Reports](#), one of every five people in the United States has a disability, either physical or mental, that affects how they navigate, use, or perceive space. Disability statistics from around the world show that disability is real and much more common than we realize.

People with a wide range of abilities should be able to use buildings and public spaces comfortably and safely, as much as possible without requiring special assistance.

People's height, hand dominance, body size, and age are all factors that should be considered during the pre-design, design, and construction phases of the buildings and neighborhoods.

Only by implementing this type of planned approach early on, can we eliminate or reduce the need for costly changes or retrofits that may be needed later.

Also, it is best to identify the needs of the expected user base as early as possible, and to test the practicality and usability of emerging designs with a diverse user group of individuals.

Universal design is not very hard to achieve. Because designing for one group generally leads to solutions that meet the needs of many others. As an example:



Image source: [pinterest.com](https://www.pinterest.com)

Step-free entrances accommodate not only wheelchair users, but also people with buggies, suitcases, or shopping trolleys, people using walking or mobility aids, and people with visual impairments.



Image source: [pinterest.com](https://www.pinterest.com)

Larger toilet compartments make it easier for wheelchair users, those carrying luggage or parcels, parents pushing pushchairs or accompanying small children, those using walking or mobility aids, and those of larger stature.



Image source: [imimg.com](https://www.imimg.com)

People with reading or cognitive difficulties, as well as those whose first language is not English can benefit from clear, well-placed signage that uses recognized symbols or pictograms.

All these examples show us we don't need to and we cannot customize design per individual person. However, strategically applied universal design practices will lead to an overall improvement of the project design that helps meet the needs of the most occupants. Also, sometimes one solution may not work for everyone, and a variety of options must be provided, such as:



Image source: stefanjhierl.de

Providing both steps and a ramp if there is a change in level or providing payphones with slots at various heights to facilitate use at standing, sitting, and by people of small stature.

PRINCIPLES OF GOOD UNIVERSAL DESIGN (UD)

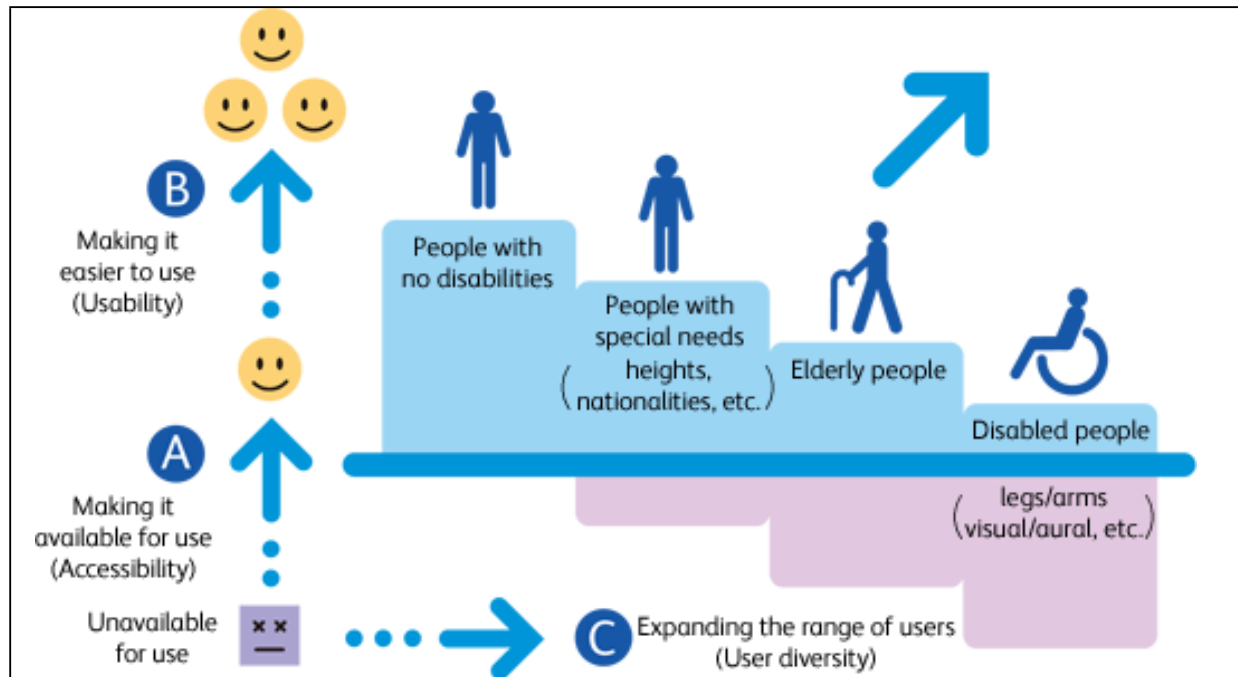


Image source: fujifilm.com

Universal design (UD) is not a one-time requirement for the benefit of a small subset of the population. It accommodates benefits of everyone offering an environment that is accessible, usable, and convenient.

UD accommodates various learning styles, preferences, and abilities, allowing for an adaptive environment that does not limit functionality. By creating a space that is open to all, we can increase our chances of assisting people who may require our services or facilities.

Here are the principles of good universal design we should strive to implement in new buildings and neighborhood projects.

Equitable use: The design is helpful and relatable to people of varying abilities.

Flexibility in use: The design supports a wide range of individual preferences and abilities. Flexibility in use is critical for fostering an inclusive environment.

Creating flexible physical spaces, electronic content, and learning environments necessitates more thought and planning at the outset.

Simple and intuitive use: Regardless of the user's experience, expertise, language skills, or present concentration level, the design is simple to grasp.

Size and space for approach: Regardless of the user's body size, posture, or mobility, adequate size, and space are provided for approach, reach, manipulation, and use.

Perceptible information: The design successfully communicates important information to the user, regardless of ambient conditions or the user's sensory capacities.

Tolerance for error: The design reduces risks and errors and the negative repercussions of unintentional or accidental activities.

Low physical error: The design can be used efficiently, conveniently, and with minimal fatigue.

Universal Design can apply to:

- Senior Living
- Urban planning
- Learning environments
- Hospitals and healthcare
- Health and wellness facilities
- Public and commercial buildings
- Parks and recreational spaces

LEED V4 ND VISITABILITY AND UNIVERSAL DESIGN

LEED v4 ND Visitability and universal design credit rewards building projects for increasing the proportion of areas usable by a wide spectrum of people, regardless of age or ability.

The credit has different requirements for projects with new dwelling units, and for projects with noncompliant routes and no new dwelling units.

Projects with new dwelling units have three options, which are listed below, and each option is rewarded with a maximum of one point for the achievement.

1. Universal design features throughout the home
2. Kitchen features
3. Bedroom and bathroom features

In order to strategically define a compliance roadmap, each of these points is provided with multiple options for projects to choose from. We will go over all of the options in greater detail, including some practical examples and reasoning behind them.

Lever handles for opening doors rather than twisting knobs



Image source: doorfittinghardware.com

A door with a lever handle is much easier to open than one require twisting a knob. Twisting can be difficult if you have limited hand mobility or when your hands are full at any given time, such as carrying groceries home from the store.

Lever handles are easier, gives people more freedom of movement especially for people on crutches or wheelchairs. Even for healthy individuals twisting mechanism can cause problems like arthritis or injuries if twisting movement repeated over the long run.

Also, doorknobs do not have the same natural grip as lever handles. A doorknob may make it difficult to operate a door for those who have issues with grip strength, such as children and the elderly.

Option 1 - Universal design features throughout the home not only encourages using easy-to-grip functionality for door handles but also for the cabinet and drawer loop handles as well as locking mechanisms on doors and windows.

Large, high-contrast print for controls, signals, and the house or unit numbers;



Image source: ubuy.com.tr

Large high contrast text is good for universal design and accessibility as it helps people with vision impairment. People who have low vision or colorblind could encounter some difficulty distinguishing text color from a background color if the contrast is insufficient. Therefore, it is important to use large high-contrast print for all controls, signals, the house or unit numbers.

A minimum 32-inch (80-centimeter) clear door opening width for all doorways.



Image source: [pinterest.com](https://www.pinterest.com)

Most wheelchairs are 24 to 27 inches wide from wheel to wheel. Also, doorways are commonly measured at 23 to 27 inches wide which is insufficient for a user to pass through. Therefore, it is expected that a wheelchair user should be able to comfortably fit through a doorway that is 32 inches wide.

Also, when there is a sharp or narrow turn to fit through the door, there needs to be more clearance for the user to exit the narrow hallway or room.

Motion-detector lighting at entrance, in hallways and stairwells, and in closets, and motion-detector light switches in garages, utility spaces, and basements.

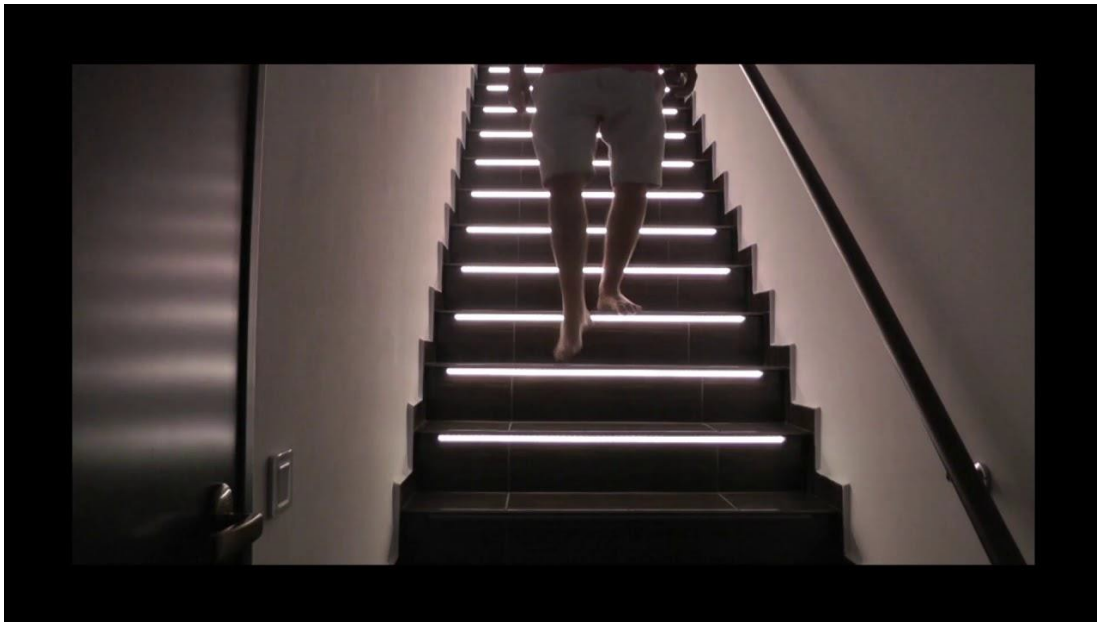


Image source: [youtube.com](https://www.youtube.com)

You may need to go downstairs or upstairs in the middle of the night, and it can be not easy to find the switch in the dark.

Because this can be a hassle, an alternative solution is to simply install motion sensor stair lights that turn on when they detect movement. This will save you energy and time looking for the switch in the dark while also preventing accidents.

LEED v4 ND Option 1 - Universal design features throughout the home

recommends implementing motion-detector lighting as often as possible at the spaces like entrances, in hallways and stairwells, in closets, garages, utility spaces, and basements.

Easy-touch rocker or hands-free switches



Image source: contestimg.wish.com

Implementing easy-touch rockers or hands-free switches makes it easier for people with restricted mobility to operate the doors, lighting and the equipment.

Putting in an easily accessible switch that does not require any physical contact can make homes more user friendly and help disabled people or those who suffer from diseases like chronic pain, arthritis.

Tread at the entrance, on stairs, and other areas where slipping is common, with color contrast difference between stair treads and riser



Image source: [sndimg.com](https://www.sndimg.com)

With the increasing number of accidents caused by slip and falls on stairs, many building projects utilizing anti-slip stair treads for a safe solution. A high traction, anti-slip stair nosing placed directly over the leading edge and on top of the stair will eliminate the possibility of slipping and possible accidents.

Surfaces that are stable, firm, and slip-resistant per ASTM 2047



Image source: [wikimedia.org](https://www.wikimedia.org) (Slip Resistance Tester)

Slip-resistant surfaces are required to reduce hazards to people with disabilities, particularly those who are ambulatory or semi-ambulatory or who use canes, crutches, or other walking aids. ASTM 2047 provides a guideline for testing and measuring slip resistance (coefficient of friction) of the surfaces.

The standard, does not specify a minimum level of slip resistance that should be expected from building surfaces because the standard focuses on slip resistance measurement rather than recommending an optimum value that building projects should pursue.

Slip resistance is important not only for accessibility but also for general safety, so standard practices for minimizing floor or ground slipperiness will likely satisfy compliance with the standards. Applications and finishes used to increase the slip resistance of a surface material may necessitate ongoing maintenance or re-application.

Standard methods for preventing or minimizing slipperiness in the specification of floor materials, textures, applications, and finishes are usually adequate for standard compliance.

Single-hand operation with a closed fist for operable components including fire alarm pull stations



Image source: [koorsen.com](https://www.koorsen.com)

Fires are a dangerous event that happen unfortunately. It is important to be able to put out fires as quickly and efficiently as possible, which means having access to the fire alarm pull stations in order for people to activate them easily.

The single-hand operation on the fire alarm pull stations is important because it makes access to emergency services easier and faster when seconds count. Also, the single-handed operation of fire alarm pull stations is necessary for those with a disability, as well as others who are not in the position to use their second hand during a fire.

Reinforced bathroom walls for grab bars.



Image source: [lowes.com](https://www.lowes.com)

Grab bars in the bathroom are an important part of universal design. They help not only people with mobility problems but also healthy individuals to balance themselves in case they need extra balancing support.

Thanks to grab bars installed in a bathroom disabled people can more comfortably and securely use bathrooms. Grab bars make sure that their safety is accounted for by giving them something stable on which they can brace themselves while going about their business, so accidents are less likely to happen.

Grab bars should be installed high enough from the floor, so they're easily accessible to most people no matter what their height or mobility level is. Color contrast between grab bars and flooring or walls can make it easier for people to notice them.

Doorbell is back-lit, easy to reach and has visual and audible cues

It can be difficult to find doorbells in the dark. People can find and use doorbells easier if they are provided as backlit doorbells within easy reach of the gate. A doorbell with audible cues can further improve accessibility for people who have problems with their vision.



Image source: [wayfair.com](https://www.wayfair.com)

Keyhole is backlit or has a motion activated light



Image source: [amazon.co.uk](https://www.amazon.co.uk)

The backlit keyhole is a very useful addition that can be used in home entry systems to make finding the keyhole easier in the dark. They are usually motion activated, and the light is activated by the movement of the hands as they approach the door lock.

Keyless or remote entry systems and security systems with visual and audible alarms



Image source: business.com

Keyless or remote entry systems should ideally have both visual and audible alarms. By having both alarms together, these systems can help hearing and visually impaired people.

Even people without disabilities will benefit from these systems since visual and audible alarms working together will improve our perception to a larger extent.

Sidelight security window that is full-length



Image source: chicagowindowguy.com

The sidelight window that spans the entire length of our home's entrance is a good implementation of universal design. Because it serves as an extra safety precaution and offers more light which benefits those with reduced mobility or impaired vision.

The windows installed on either side of our front door help meet certain requirements to allow people from different demographics to feel safe at night while visiting us.

For example, these large panels provide safer access by providing enough illumination when someone approaches the house from outside after dark due to poor lighting conditions like cloudy or foggy times where visibility may be limited.

Interior floor surfaces (e.g., low-pile carpets, hard-surface flooring) that provide easy passage for a wheelchair or walker, with color contrast between floor surfaces and trim;

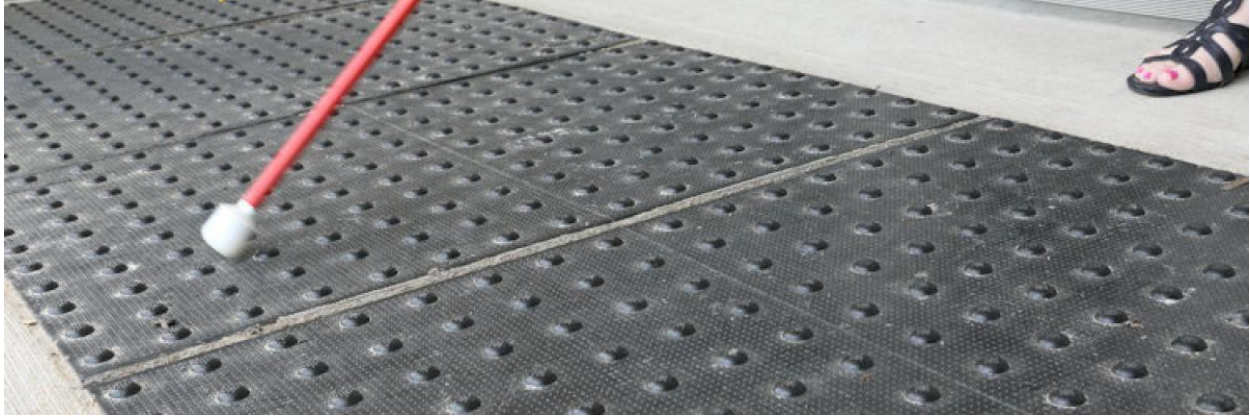


Image source: cnib.ca

Although many people with low vision have poor color perception, color can still be used to improve independence, safety, and accessibility.

- Because of their ability to reflect light, bright colors are generally the easiest to see.
- Colors that are solid and bright, such as red, orange, and yellow, are usually more visible than pastels.
- Color perception can be influenced by lighting: dim light can “wash out” some colors, while bright light can intensify others.

A toe kick area at the base of lower cabinets with a minimum height of 9 inches (23 centimeters), and full-extension drawers and shelves in at least half (by volume) of the cabinets;



Image source: pinterest.com

Toe kick spaces are an essential component of kitchen design. In fact, any cabinet in which you would stand should have one. A toe kick's purpose is to create a recess for your feet, allowing you to stand closer to the countertop or workspace more comfortably.

Adjustable-height shelves in wall cabinets



Image source: granberg.se

Nowadays there are many brands manufacturing adjustable-height shelves to be used in kitchen. These shelves are controlled with electric lifting systems allowing for wall cabinets move up and down.

They provide adaptability and accessibility in order to meet the diverse and changing needs of individuals and facilities. They can be used seated or standing, are designed for easy and safe access, and can be combined with worktop lifts to completely adapt the application.

Selecting adjustable height shelves following should be considered:

- The individuals need and requirements and/or others using the space.
- A person's capacity, especially considering upper body strength and reach.
- Will the person's condition or environment be changing?
- Would they be used in a seated or standing position or both?

Glare-free task lighting



Image source: pablodesigns.com

Glare from poorly shielded outdoor lighting is bad for our health because it reduces contrast and thus impairs vision. This impairs our ability to detect potential hazards at night. The eyes of the elderly are particularly vulnerable.

Standard task lighting typically use incandescent or fluorescent light bulbs, which emit light in all directions, causing excessive glare. In order to reduce glare, lighting should be shielded, and LED lights should be used since they allow creating directed beams without glare.

Provide knee space under the lavatory



Image source: wheelchairtravel.org

An accessible bathroom design should have lavatories that have the minimum knee clearance and be free of equipment or obstructions. Although acceptable clearances are not provided by LEED, the ADA Standards specify the best practices projects can pursue.

According to ADA, the minimum knee clearance must be free of equipment or obstructions for a minimum of 8 inches (205 mm) extending from the front edge of the lavatory back toward the wall. This knee clearance must be 29 inches (735 mm) high at the front of the lavatory and no less than 27 inches (685 mm) high at a point 8 inches (205 mm) back.

In addition, a minimum 9 inches (230 mm) high toe clearance must be provided extending back toward the wall to a distance no more than 6 inches (150 mm) from the back wall. The toe clearance space must be free of equipment or obstructions.

The maximum height of the lavatory is 34 inches (865 mm). The bottom edge of a wall-mounted mirror must be mounted no more than 40 inches (1015 mm) above the floor.

REFERENCES

- 1 – [LEED v4 ND Visitability and universal design, USGBC](#)
- 2 – [Disability statistics in the U.S., Census Bureau Reports](#)
- 3 – [Wheelchair accessibility guidelines by Karmanhealthcare](#)
- 4 – [General accessibility guidelines by Sheltercluster](#)
- 5 – [Lavatory Clearances by ADA](#)