

Barriers and Their Social Meaning

Design as Evolution

Much of life is about overcoming barriers. Every organism, from lowly one-celled animals to human beings, exists by interacting with its environment. This interaction includes moving from one place to another, creating a space for the self, lifting a load, or learning how to use a tool. Our ability to interact with the environment is, to a great degree, determined by our characteristics and abilities, such as height, strength, and intelligence, but also by the degree of resistance and its corollary, the support the environment provides in reaching our goals. The relationships humans have with the environment are much more complex than those of other organisms. We have reasoning abilities and tools that give us more freedom of interaction and a wider range of adaptive responses. Ants, for example, use instinctual foraging behaviors to find food and bring it back to their nests. If an ant encounters an obstacle in its path back to its nest, it may climb over or around it. If an observer drops more obstacles in its path, the ant continues to use the same limited set of behaviors to overcome the barrier. Humans, however, have a much larger range of adaptive behaviors. Faced with a situation similar to that of an ant, a person might remove the obstacle, use a map to find an alternative route, or find another source of food. People also can psychologically adapt to the presence of a barrier. A good example is the prisoner who overcomes physical confinement by exploring an interior intellectual world.

Human social groups have developed sophisticated methods of adaptation to overcome the resistance of environments. Design is an active, purposeful adaptation method that people use to adjust their world to their needs. Through design, humans both remove barriers and develop supportive environments, products, and systems to facilitate achievement of their goals. Design interventions have evolved with human experience and the development of technology. For example, one of the first tools early humans learned to use was a sharp-edged rock. Over time, some people discovered that such a rock could be enhanced by fashioning a sharper edge. Later humans discovered that fashioning a handle on part of the rock increased the comfort of using

such a tool. To hunt larger game that would provide more food to support a growing community, others discovered that adding a long handle to the rock added leverage and reduced effort. This was the first prototype of the modern ax (Williams 1981). Figure 1–1 shows this evolution.

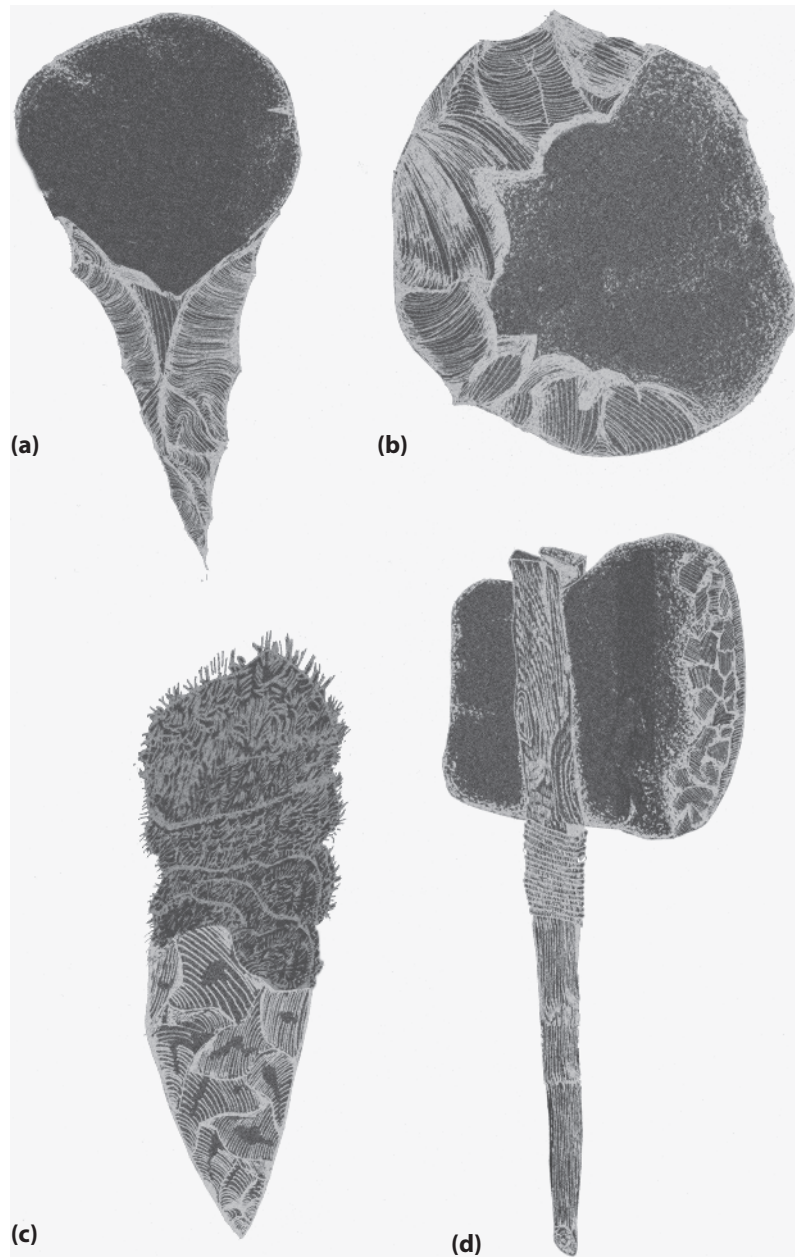


Figure 1–1: Evolution of the ax. Four examples of axes including (a) a rock fragment with sharpened edges, (b) a rock with a sharpened edge and a smooth area for easy grip, (c) a rock with sharpened edges partially covered with hide for a handle, and (d) a club with long wooden handle for leverage.

Source: Adapted from Williams (1981)

Technology can be a barrier as well as a facilitator for usability. For example, the flat-bottomed skiff is a traditional boat design that is ideally suited for use by shell fishers in shallow tidal water. The invention of the outboard engine offered opportunities for fishermen to be more productive, but mounting outboard engines on flat-bottomed skiffs made them unstable (Williams 1981). A new type of boat needed to be designed to overcome this problem. The Boston Whaler is an example of a modern design that works well in shallow water with an engine.

Adaptation is not always successful from an individual and/or community perspective. It can put an individual at risk, lead to maladaptive behavior, or put other people at risk. For example, if residents of a neighborhood adapt to violence by isolating themselves in their homes, afraid to go out in public, both the residents' quality of life and the health of the community suffer. Design interventions can also lead to negative consequences. Large residential institutions, such as poor houses, mental hospitals, and penitentiaries, were a late nineteenth-century adaptation to urbanization and the resulting increase in crime, poverty, and disability concentrated in cities. But these facilities created enormous barriers to independence and mental health, stigmatized their residents, and corrupted their caretakers (Foucault 1973; Rothman 1971; Sommer 1969). As knowledge about these problems developed in Europe and North America, most of these institutions were dismantled, and new policies of community living and short-term treatment emerged.

Within the context of human evolution, the purpose of design is to help the species increase its survival potential. Design is more than aesthetics, which is primarily a surface effect. Its fundamental purpose is to change the form and organization of our material world and even change how we interact with it. For example, changing the size of schools or developing a gestural language to control computers are both design decisions, even more important than the decision about what color, material, or shape to make the building or computer enclosure. Design is a "soft" tool that extends the effectiveness of human adaptive behaviors.

An environment can provide different degrees of support. Often people are satisfied with lower levels of performance than what could be achieved. Sometimes they accept barriers for some people but not for others. They may even intentionally create barriers to separate certain people from the larger community or one group from another, as in the case of the residential institution. Other goals, such as aesthetics or cost, sometimes may take precedence over the degree of enablement a built environment, product, or system provides.

Universal design, at its most elemental level, seeks to make our built environment, products, and systems as enabling as possible; in other words, it seeks both to avoid creating barriers in the first place and, through intelligent use of resources, to provide as much facilitation as possible to reach human goals. Social and technological trends have converged to put more value on enabling design. We discuss the underlying reasons for these trends in Chapter 3.

Barriers as a Universal Experience

Because the elimination of barriers is so central to the universal design philosophy, it is important to begin this book with an examination of barriers as an experiential and intellectual phenomenon. Doing this will help the reader to understand the potential scope of universal design and the reasons why it is so important in contemporary design thinking.

Any obstacle we encounter can be a barrier to reaching our goals. Barriers may not be complete obstacles but simply resistance of some sort. For example, although a narrow doorway may not entirely prohibit a crowd of people from exiting, it could increase the total time it takes to exit. In an emergency, this can be fatal for some occupants. Other types of barriers are less severe; nevertheless, if many, many minor barriers are encountered in a relatively short period of time, they can be annoying, deter people from reaching goals, and result in the behavioral adaptation of avoidance. For example, driving a car in a congested area for a business appointment may result in many small inconveniences that add up to missing the appointment. A few experiences like that in the same area could result in a decision to seek opportunities elsewhere.

In everything we do, there are barriers: barriers to movement, barriers to space and time, barriers to access, barriers to communication, to perception, or to expression. Although blockades such as walls or locked gates that totally preclude access are obvious, other barriers are not always that easy to perceive. Less obvious examples are steep slopes and inclines, channeling that forces choices and limits spontaneity, discontinuity in flows, distances separating people or things, shortages of space that require people to take turns, noisy places that limit conversation, and cultural markers with little physical substance but high prohibitions on entry. In the world of products, we encounter such barriers as complex operating procedures, excessive forces of operation, ill-fitting equipment and furniture, and things that make us look awkward and out of place in the eyes of others.

A barrier does not always totally exclude use. It can make use difficult, or it can also be a selective barrier that allows use by one group of people and not another or that regulates access by schedule. Moreover, a barrier may be supportive in one sense and restrictive in another. Crime scene tape is an interesting example. It is a very flimsy barrier but one that is very powerful because of its cultural significance and legal implications that force people to avoid an area without significant physical means. Some law enforcement authorities can pass through the marked-off scene while others can enter only with permission. Cubicle farms are another, less obvious type of barrier. They support increased communication among workers on one hand because there are no full-height walls or doors, but they limit our ability to communicate our unique personality, thus creating fodder for a genre of humor about cubicle culture.

If we reflect about encounters with barriers as a general class of experiences faced in daily life, we can conclude that they all impede or restrict the flow of action, information, and communication. Barriers are significant to us in many ways. They can block us out, slow us down, divert us from our goals, cause fatigue, limit our opportunities, or restrict our ability to express ourselves. Barriers can even be used to control people to make them follow a predetermined course of action determined by others, reducing their ability to make choices. Consider, for example, a voicemail menu system or a security checkpoint that forces us to complete a series of meaningless or even degrading tasks to obtain services or benefits.

Barriers in Intellectual Life

While we normally think about barriers as part of our everyday life, they play an important role in our intellectual life as well. The sculptures of Richard Serra are some of the most powerful examples of barriers in art. He constructs huge planes of steel to divide space. When experiencing these sculptures in person, the walls of crude steel are overwhelming. They heighten our perception of barriers and demonstrate the power to separate and divide. Serra's *Tilted Arc* was originally installed as a site-specific work in Federal Plaza, New York City (Figure 1–2).



Figure 1–2: *Tilted Arc*, a sculpture by Richard Serra. Constructed in 1981, this sculpture is a 120-foot- (36.6-m-) long slab of curved steel, 12 feet (3.66 m) tall and 2.5 inches (6.35 cm) thick. It was designed to bisect a public plaza in front of the Jacob Javits Federal Building in Manhattan.

The office workers who regularly used the space complained that the work ruined the plaza, cut off views, created an obstacle to pedestrians, and was a hiding place for criminals. After a long, protracted legal battle, eventually *Tilted Arc* was removed, even though the public had paid for it through a percent-for-the-arts program (Senie 2002). The reaction that this sculpture provoked illustrates the power that barriers have to affect our lives and the anger that people can feel when restrictions are imposed on them. Even though Serra's work was critically acclaimed, the regular users of the space experienced its direct impact, which overshadowed any value it had to them as art. New Yorkers put a high value on accessibility to public places. It is possible that *Tilted Arc* would not have provoked such a reaction in other locations. The story of *Tilted Arc* demonstrates the interpretive component of barriers. One person's art can be another person's symbol of government interference in his or her life.

By its very nature, two-dimensional art creates barriers to perception. That is the source of its power. A two-dimensional image cannot be explored; the artist presents only one perspective to us, and it communicates only a specific intent. The frame of a painting and the bounded edge of a photograph limit the viewer's access to information. We cannot see what is happening outside the frame. Moreover, the static image prevents us from seeing, exploring, and knowing what is beyond the forms within the frame of the art piece. A good example is *Melancholy and Mystery of a Street* by Giorgio de Chirico (Figure 1–3). In this painting, the shadow on the ground is a strong clue to the presence of something outside the frame, something quite foreboding. So much detail is left out of the representation of buildings and space that the painting creates the feeling of the city as an enigma, an unknown place where potentially dangerous events may occur. The fragile image of the child projects a sense of vulnerability that we often feel in some urban streetscapes.

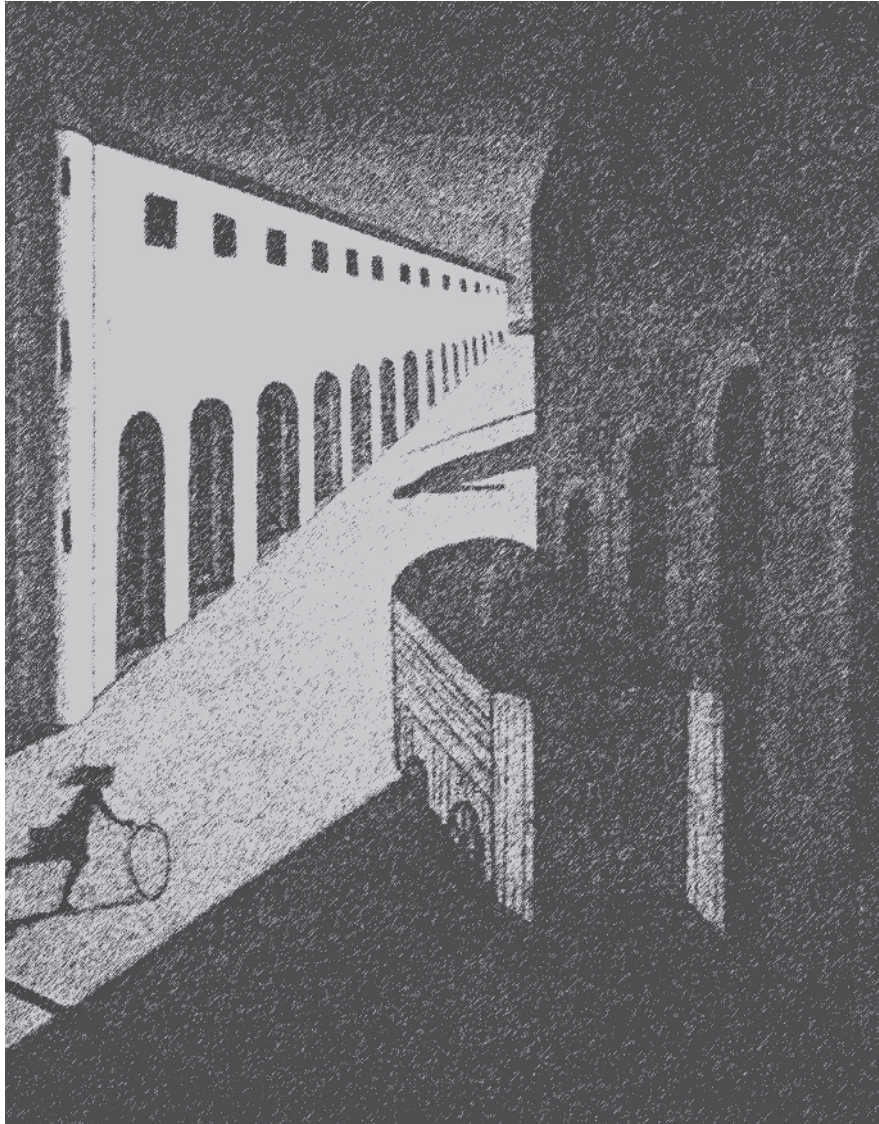


Figure 1-3: *Melancholy and Mystery of a Street* by Giorgio de Chirico, 1914. The painting depicts an urban streetscape with a silhouette of a young girl pushing a hoop along a street. Out of view is a mysterious and ominous figure depicted only by a shadow falling across the street.

Source: Image redrawn by authors.

Physical restrictions are often used as metaphors in literature. One of the most interesting examples is the metaphor of overcoming resistance as a transformation in understanding. In the novel *Snow Falling on Cedars* by David Guterson, a relentless snowstorm serves as a metaphor for the gradual shift in the perception of history and fact surrounding a murder trial. As the snowstorm advances, the world of the island on which the story takes place presents more and more resistance to the activities of daily life. The chief protagonist, Ishmael (undoubtedly a reference to the narrator in Melville's *Moby-Dick*), the town's newspaper publisher and its only

reporter and photographer, doggedly pursues facts about the case as the trial proceeds in the courthouse. As he does so, his perceptions of the case are altered. Here is a quote from the book:

Outside the wind blew steadily from the north driving snow against the courthouse. By noon three inches had settled on the town. A snow so ethereal it could hardly be said to have settled at all. Instead it swirled like some icy fog, like the breath of ghosts. Up and down Amity Harbor's streets. Powdery dust devils frosted puffs of ivory cloud, spiraling tendrils of white smoke. By noon the smell of the sea was eviscerated. The site of it mistily depleted too. One feels the vision narrowed in close. Burned in the nostrils of those who ventured out-of-doors. The snow flew up from their rubbery boots as they struggled. Heads down towards Peterson's Groceries. When they looked out into the whiteness of the world, the wind flung it sharply at their narrowed eyes and foreshortened their view of everything. (p. 170)

The familiar world of the island was obscured. The snow created both physical obstacles and obstacles to perception where none had been before. The storm unfolds as the testimony in the trial makes the first and most obvious explanation of the death harder and harder to understand. But the true facts are not easy to uncover due to the complexity of the human relations leading up to the incident. Later, as Ishmael starts to solve the mystery, the weather changes:

Outside he found the snow had stopped. Only a few scattered flakes fell. A hard winter sunlight seeped through the clouds. A north wind blew hard and fast. It seemed colder now than it had been that morning. The air burned in his nostrils. The wind and snow had scoured everything clean. There was the sound of snow crunching under his feet. The whine of the wind and nothing else. The eye of the storm he knew had passed. The worst of it was behind them. It occurred to Ishmael for the first time of his life that such destruction could be beautiful. (p. 427)

As the storm clears up, in the clarity of the bright sunny day framed by the virgin snow, barriers disappear, the murder mystery is solved, and the townspeople's perception is altered. They see things in a new light.

The barrier of disorientation has been used heavily as a metaphor in literature. In the famous existentialist novel *The Castle* by Kafka, a surveyor named K arrives at a town to which he has been summoned by a government official to do some work. K spends much of the story trying to contact the official who works and lives in the castle on the hill above the town. He does not know what is required of him and is unable to get a clear idea of whether he will even begin his work. Throughout the story, he is never able to make contact with the official or anyone else in the castle except through a messenger and other second- and third-hand sources. K suffers bouts of disorientation, disillusionment, and distraction. The most enduring image is of K trying to get closer to the castle, becoming confused by the labyrinth of streets in the town and never finding it. In fact, the closer he seems to move toward the castle, the farther it seems to recede in the distance.

The castle could be a symbol for life as a search for purpose. The inability to obtain clear "instructions" for life leads to a feeling of unease. This gap of understanding creates the psychological feeling of being lost and adrift, disoriented without purpose. This is a universal feeling that we have all experienced at one time or another as we try to understand the mystery of life.

Barriers as metaphors in film are also common. Consider all the *Die Hard* and *Lethal Weapon* films in which the heroes encounter incredible adversity and, of course, overcome it all by

cleverness and toughness. But communication and emotional barriers are also fertile subjects for film. In Wim Wenders's movie *Paris, Texas*, space is used as a metaphor for psychological distance between people. The protagonist seeks to reconstruct his family after his wife has left him and their child. The empty barren Texas plains that he travels through on his quest to find her symbolize the emotional distance between them. When he does find his wife, she is working in an adult entertainment shop. He can only see her by buying time and talking through the glass of a peep show booth. This scene uses barriers in space and access to information as a powerful comment on the gulf between estranged partners. The movie highlights the role of negotiations, power, and desire in the relationships between men and women.

Barriers play an important intellectual role in scientific endeavor. Much like the fictional K, real scientists are forever running up against barriers to knowledge and understanding. In fact, it could be argued that the desire to uncover knowledge and overcome those barriers is a prime motivator behind the scientific endeavor. One good example is the limitation on our powers of perception to observe the workings of the universe. Even using telescopes, microscopes, and scanning devices, we cannot uncover or record phenomena beyond certain levels.

Beyond the physical, there are intellectual barriers in science as well. Science evolves through systematic research. Observations that do not fit within the established theories are identified. As these unexplained phenomena add up, they precipitate critical periods in the history of science when shifts in thinking, or new paradigms, occur (Kuhn 1962). Old theories are replaced by new or improved theories. The scientific "breakthrough" removes artificial restrictions on thinking within a limited frame of ideas and provides a new intellectual perspective to conduct further research. The two most obvious examples in the history of scientific paradigm shifts are the change in the conception of the world as a flat surface to a sphere and the shift from the belief that the sun and planets revolve around the earth to the understanding that the earth and other planets all revolve around the sun.

The experience of barriers in both everyday human life and intellectual life clearly is a central phenomenon of human existence. Not only do barriers serve to limit our everyday actions, they also can alter our perceptions and our understanding of the world, our place in it, and our sense of purpose. It is no accident that barriers play an important role in the life of the intellect as well as in the more ordinary aspects of human experience. The common shared experience of barriers in daily life makes them a ripe subject for intellectual curiosity and useful as metaphors to communicate universal truths.

Social Functions of Space

Barriers clearly play a major role in design at all scales. It is important to note that the same physical features can both facilitate and impede the achievement of goals. The most obvious example is how a door can simultaneously protect a home from unwanted entries (prevent people from coming in) while also providing privacy for the household (prevent information from going out). Another example is a toll road that both facilitates social interaction and excludes those who cannot afford the toll. A third is the mobile phone, which facilitates communications but also may increase interruptions. Thus, the barrier, as used here, is a psychosocial construct, not the physical feature itself. This psychological nature of barriers is always open to interpretation by individuals and groups. Understanding those interpretations is a major focus of universal design.



Figure 1-4: Public marketplace. This market is located in a public square in Stockholm, Sweden. Each vendor has a stand with a tent-like structure providing weather protection. All the stands are the same size and arranged in rows.

The relationship between the social order and spatial order of society is one of the most important topics in universal design. Ordering space is achieved by claiming space through protective or legal boundaries that control access to the resources within. This activity is called territorial behavior. Some territories are private and used exclusively by one person; some are shared by a few, and some are public in that a large number of people share them. Figure 1-4 shows two examples of territories in one space, a public marketplace with stalls that are owned, at least temporarily, by individual vendors. Objects can be part of territorial behavior; some objects, such as automobiles and camping tents, are territories themselves, although mobile rather than static. Claiming space is an innate behavior exhibited by all animals, not a behavior unique to humans. All animals defend and control access to places and things for their own benefit. Territorial behavior has survival value. It ensures predictable access to resources. It protects assets from being taken by another animal, helps organize social relationships, and communicates important rules of behavior within a group or species. Literal examples of territorial behavior among humans include the building of fences and walls to demarcate one's property, separating it from a neighbor's; protected national borders; and no-trespassing signs. The spatial distance that we normally keep between us and others, or the body buffer zone, is an example of a portable territory that is not tied to one particular set of spatial features but is a short-term claim on space (Hall 1969; Sommer 1974).

The resources that generate claims on space and objects are quite diverse. Territoriality may involve claiming strategic locations for commerce or defense. A good example in contemporary culture is how Starbucks attempts to dominate a coffee market in certain neighborhoods by claiming the most exposed locations on every street corner. Physical attributes of an environment or an object can be resources for their own sake. Thus, a home site with a good view of an ocean is a very desirable property; a comfortable chair may become a regular visitor's

favorite seating location in the shared space of a library reading room. Proximity to other people can be one of the resources that people seek in claiming territory—for example, living in a high-status neighborhood or an arts district. Information can also be a desirable resource—an office located close to the leader of a work group is desirable for an aspiring executive, providing opportunities to share information (Steele 1986). Finally, sometimes it is the absence of something that makes a place desirable as a territory, as in a quiet neighborhood or distance from neighbors.

People, like many other animals, mark territorial boundaries to identify owners and communicate information about their social status. Shared understandings about these markings develop within a culture, including precise legal definitions. Social relations are reflected in both the pattern of territory and the markings used. These patterns and markings denote and connote many aspects of social relations, including social dominance and roles, such as gatekeeper or boss, and class. As an example in architecture, during the Renaissance in Italy, each urban estate house, or palazzo, was divided vertically into a servant floor, a *piano nobile* (“noble floor” or “noble level,” the main floor in a Renaissance building), and living quarters. The spatial organization of a palazzo reflected the degree of access that different classes of outsiders might have to the inhabitants and the social status of different types of inhabitants as well. Stable hands did not get access to the *piano nobile*; family friends were entertained there but did not necessarily get access to the living quarters.

Privacy is the process of adjusting control over information about the self to desirable levels. It is a second function of barriers, often used in conjunction with territorial behavior. In privacy behavior, the physical and virtual environments are organized to control information flows between people. We need such control for many reasons, such as preventing negative information about the self from being known, maintaining security of financial information, or simply to provide an opportunity for self-reflection, free from the need to be “on stage” in social relations. The design of space, through physical boundaries, distance, and spatial organization, is a method used extensively to control the flow of information. Many boundaries created to maintain privacy are purposely adjustable because the desired state of information control varies over time. Closing and opening doors, gates, and curtains and other flexible boundaries help us achieve the state of privacy we desire. The desired level of control is based on the social interaction goals, emotional state, or activities of individuals and groups. Clearly, privacy behavior also can erect barriers to communication. The teenager who locks himself in his room to avoid his parents is a good example. Designing for privacy is also evident in the virtual world. The best examples are social networking Web sites through which individuals communicate their online identity but also restrict access to classes of people, such as friends, relatives, and colleagues.

Identity behavior is the third key function of barriers. People communicate important information to each other during social relations, which include friendships, work, education, politics, love, and rituals, such as religious activities. For example, we need some means to identify who is the teacher and who are the students, we need to know who is qualified to build a house or prescribe medication, we need to know how to recognize a police officer, and we need to know who our potential partners, friends, and enemies might be. If we are a teacher, a doctor, or a police officer, we use identity behavior to convey our status and obtain respect. If we are looking for a relationship, we use identity behavior to advertise who we are in order to attract a compatible person.

Territoriality and privacy are both two spatial practices that we use to manage identity. For example, territorial markers are often used to convey information about the owner of the

territory, and the degree of privacy sanctioned for an individual is often an indication of rank in an organization's power structure. These spatial practices involve the use of products and information to convey status messages to others and evaluate the status of other people. However, identity behavior extends much further than claims on space or regulation of spatial boundaries. It encompasses a wide range of behaviors, including diet, clothing, hairstyles, language, posture, and mannerisms. It can be argued that there is nothing an individual does that does not somehow convey information about the self.

People manage their identity in many ways. We tell people things about ourselves and we withhold other information. We wear clothes and adornments that indicate our status, group membership, and personality characteristics. Obvious examples are military and public safety uniforms, religious emblems, and gang tattoos or colors. The style, material, and color of clothing, jewelry, and accessories and even their brands convey information about the self. We adopt certain mannerisms, rules of etiquette, vocabulary, and other elements of spoken language to make a specific impression. We even use gestures or body language, such as bowing, shaking hands, and conversation postures, to communicate personal information. We select and decorate our homes and personal vehicles to communicate economic status, group membership, or lifestyle interests. It is important to note that neglect of certain aspects of identity behavior, such as home décor or clothing, also communicates important information about an individual's identity. For example, a person who values spiritual things above material ones may choose to live a very ascetic lifestyle rather than accumulate possessions, even if he or she can afford them. In addition, people are adept at conveying false messages to trick others into believing they are someone very different from who they really are.

The ability to manage identity depends a great deal on the resources available and within an individual's or group's control. People with low incomes clearly have less autonomy than people with higher incomes because their resources are more limited. They often have to accept less autonomy to obtain the resources they need for survival. For example, to qualify for publicly assisted housing, individuals usually have to disclose details about their personal finances and may not be able to prevent managers from entering their apartment without permission. Thus, it can be more difficult for them to manage privacy or prevent territorial encroachment; consequently, they appear more vulnerable. In comparison, affluent people can afford to purchase a home in a neighborhood of their choice and fill it with objects that carefully communicate an identity that they fashion. They can also keep out neighbors and even the government, all of which reduces their vulnerability. But even high-income individuals may be subject to restrictions in autonomy. For example, a patient in a hospital has to abide by the hospital's rules, including wearing hospital gowns and eating prescribed foods. Hospitals, in fact, are uniformly disliked due to their active discouragement of identity behavior.

Individual or group characteristics can create a spoiled identity, or stigma (Goffman 1963). Stigma can originate with one characteristic but, through the interpretations of others (often due to misconceptions), spread to the whole person. Thus, people without money, homes, or possessions are often perceived to be "incompetent" due to their apparent inability to take care of themselves. The potential to have a spoiled identity is greater if negative characteristics of individuals are obvious and especially if these characteristics are associated with the body or mind. Some examples are physical disability or disfigurement, obesity, speech impediments, behavior associated with mental health conditions (e.g., talking to oneself), evidence of disease, or a criminal record. These characteristics can even overshadow the ability to control resources, such as high income or high status in an organization. Even a high

government official, such as the president or a wealthy financier, can be stigmatized by illegal activity or disclosure of unusual sexual practices. Spaces and objects are often associated with high-status groups; consider McMansions and luxury automobiles. Likewise, spaces and objects associated with devalued or stigmatized groups can also carry stigma. Examples are decoration schemes associated with institutional life or grab bars, associated with healthcare facilities.

Sociospatial Order

When there is more than one person involved, spatial boundaries and organization are negotiated. Social order, spatial order, and information flows are intertwined. The social order determines the spatial order and communication channels, which, in turn, tend to reproduce the social order. But the patterns can be broken. The institutions described earlier are examples of attempts to change the social order by teaching poor people marketable skills, curing people with mental health conditions, and reforming criminals by using spatial practices. (They did not work.) Modernist designers sought to reform the established social order using design as a tool. There are many examples, but one in particular illustrates this goal in a way that has contemporary relevance.

The Schindler house (Figure 1–5) was designed and built in the 1920s by Rudolf Schindler, an architect, and his partner, Clyde Chase, for them and their wives, Pauline and Marion (Hayden

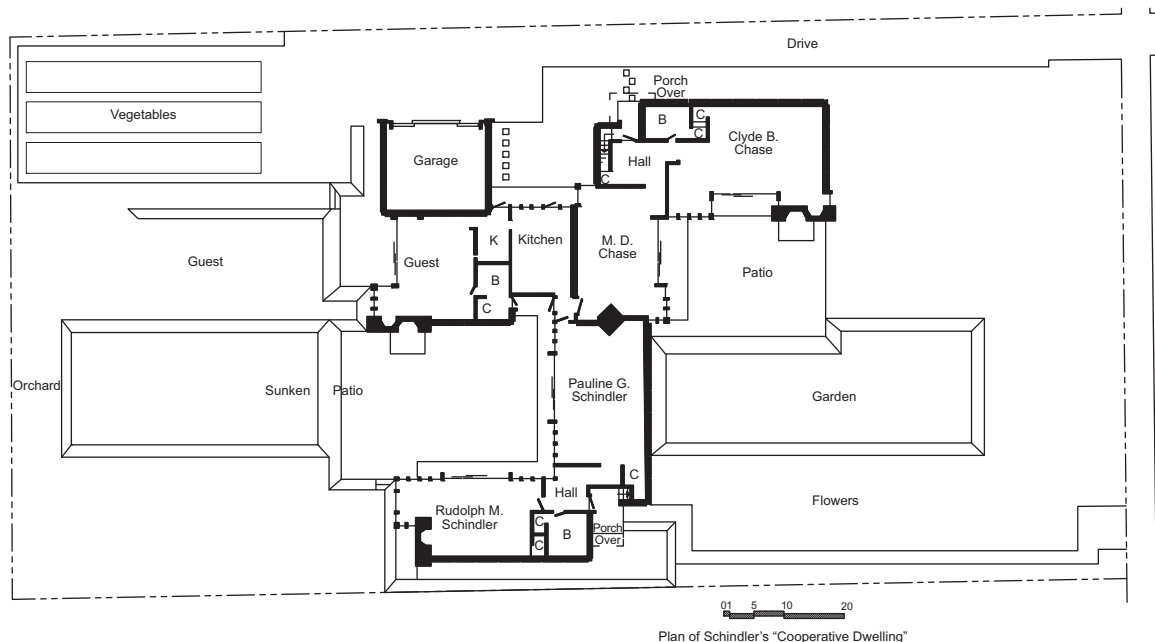


Figure 1–5: Plan of the Schindler House. The house has two interlocking L-shaped wings, one occupied by Rudolf and Pauline Schindler and the other by Clyde and Marian Chase. Each L-shaped unit defines an outdoor courtyard, and each wing of the L is a studio. The L's intersect at the kitchen and garage.

Source: Images redrawn based on that in Hayden (1982)

1982). The couples evidently had very egalitarian relationships for the time since each of the four individuals occupied similar spaces for work and personal territory. Rudolf and Pauline Schindler lived in one wing and their friends Clyde and Marion Chase lived in the other. Each couple had a great deal of privacy inside and outside, since each wing only had windows onto its own yard. However, the spatial organization of the home conveys a mixed message about gender equity. Each of the four people had similar access to the resources of the home—kitchen, garage, bathroom, and so on—but the women's studios are located next to the kitchen. What does this signify? Presumably, the spatial order of this household was negotiated between couples and between the men and the women; thus, the floor plan should represent the relative power of the couples and genders. Due to lack of information, we have no clear way to understand the dynamics of the negotiations. Did the women want more control over the kitchen and have the power to claim it? Were they delegated responsibilities for domestic duties the men did not have? Did the men claim the space with more privacy (and therefore less access) and less domestic responsibility? Whatever the reason, the floor plan demonstrates a very different use of space from a gender perspective than even most houses built today; it represents a social order leaning toward more communality and equality than that of typical American households.

The need for boundaries between people, control over traffic flows, and use of objects to communicate identity cannot be denied. Determining what those relationships should be is, in fact, a major responsibility of designers. But a major question for all of us is what barriers are created in the process and what they represent for society. Negotiated spatial orders define the differences between individuals: Who is in, who is out, who has access to resources, who is denied access, who wins, who loses, who is empowered, and who is neglected? The experience of barriers is universal, but not everyone has the same ability to overcome barriers that may restrict independence, social engagement, and the communication of a positive identity. Therefore, designers, their clients, officials, and others should understand the impact of their decisions, particularly on disadvantaged groups.

People with little power rarely have a voice in the negotiations over space, and thus their interests are often ignored, which makes it even more difficult for them to achieve functional independence and social participation. It is no coincidence that civil rights activists recognize the relationship between dominance and space and seek to alter both oppressive spatial and social practices. The term “breaking down barriers” is often a metaphor for achieving civil rights at the broadest level. Perhaps the best example of the relationship of powerlessness and space is homeless people, who essentially have no place of their own and have to carve out a territory in public space, a territory on which their hold is tenuous and that is subject to invasion at any time.

If a group is perceived to be a threat by the community or powerful elite, very drastic measures may be used to cut it off from access to community resources. For example, the Panopticon was a prototype design for prisons (Figure 1–6) based on the belief that the social environment was the cause of criminal behavior. The goal of the Panopticon was to separate criminals, keeping them from communicating with other criminals and to keep them under constant surveillance as a way to ensure that they would “behave.” Enforcing cultural norms would reduce the chances that inmates would return to criminal life when they were released (Strub 1989). Thus, the prison actually was designed as a sort of machine for changing behavior. In a similar way, asylums were designed to regularize behavior and calm persons with mental illnesses. It was believed that living in a very regular (and understimulating) environment would be therapeutic (Shorter 1997).



Figure 1–6: The Panopticon. Developed by Jeremy Bentham, an English natural philosopher, the Panopticon is a design concept for prisons that, in its purest form, allows the guards, stationed in the middle of a circular plan, to have direct surveillance of all prisoners, whose cells are arrayed around the perimeter of the circular plan and stacked on multiple floors. Due to the configuration, prisoners cannot see into nearby cells.

Source: Image courtesy of Friman

Breaking down barriers can allow people who are disadvantaged or oppressed, in a literal sense, to gain access to resources. Elimination of barriers symbolically also marks progress toward the ultimate goal of social justice, even if it is not yet fully attained. In some cases, breaking down a barrier can become a symbol that liberation has finally been achieved, even though the removal of the barrier has no significant impact anymore. Unification of Germany and freedom of movement across the old border between East and West occurred prior to tearing down the Berlin Wall. But when people were allowed to begin physically tearing it down themselves, the symbolism of the act sparked a huge celebration.

It should be noted, of course, that restrictions on access sometimes are warranted. For example, the quarantining of people with contagious diseases makes sense because it helps to reduce the spread of the disease. And incarceration may be the only viable solution for very violent people who are a threat to the safety of other citizens. Finally, controlling borders to prevent terrorist infiltration and other aggressive actions is certainly understandable for the welfare of society. We are concerned here with the removal of *unnecessary* barriers that restrict individual and social development and ultimately social justice for all citizens.

Origins of Universal Design

Equality of access to the environment has always been an issue in civil rights. In the United States, prior to the Civil Rights Act of 1964, some states and municipalities had laws that banned African Americans from using the same building entries and hygiene facilities as whites, required them to attend racially segregated schools and public facilities, and to sit in the back of public transit vehicles. Segregated facilities were usually of inferior quality. Discrimination when renting and purchasing housing was also common, even in communities where there were no segregation laws. The apartheid policies in South Africa are another example of how spatial practices can result in discrimination and oppression by denying a class or classes of people access to such community resources as education, housing, healthcare, and recreation opportunities. These practices have been directed not only at racial groups but also at groups defined by many other characteristics, such as religion, ethnicity, class, gender, sexual orientation, and disability. Such practices need to be eliminated to ensure civil rights and provide social justice.

Universal design emerged out of the disability rights movement, which began in the late 1960s, although there are earlier precedents. Its goal is to bring people with disabilities into the mainstream of society by ensuring equal opportunity and eliminating discrimination based on disability. The movement is worldwide in scope and is evolving on all inhabited continents. A central activity in reaching the goal of equal rights for people with disabilities is removing barriers to access and use in the built and virtual (digital information) environment. In 1968, when the first U.S. federal law mandated accessibility of federally financed buildings to people with disabilities took effect, a struggle to change the physical character of our communities began—a struggle that is not yet over. Unlike other targets of discrimination, for people with disabilities, the details of environmental design are critical. For racial minorities, removing discrimination in access to public places means changing the rules of how a building or facility is used. In the case of religious minorities, it may mean removing restrictions on the construction of places of worship. To achieve civil rights for the citizenry in a dictatorship, it may mean open access to the Internet and freedom of assembly in public places. However, for people with disabilities, the actual design of built environments and information technologies is a part of the discriminatory practice.

Through the disability rights movement, people with disabilities have redefined themselves. The symbols used in the movement provide a good indicator of how far that change has come. The International Symbol of Accessibility (ISA) (Figure 1–7) denotes the availability of accessible facilities. The symbol was developed by a Danish design student who won a competition sponsored by Rehabilitation International, an international organization of rehabilitation professionals, in 1968. However, by the 1980s, disability rights advocates had started reinterpreting the ISA. Advocacy groups such as the Paralyzed Veterans of America felt that it was too passive and clinical looking. They developed alternative symbols to convey a more active, forceful image. The National Endowment for the Arts followed through with this approach in modifying the ISA (Figure 1–8).

Using the precedent of other civil rights laws, disability rights advocates in the United States were successful in obtaining passage of many laws that prohibit discrimination based on disability. Similar movements in other countries followed. The scope initially focused on public accommodations, but it has expanded to include housing, places of employment, public transportation infrastructure and vehicles, and communication systems, including the Internet.



Figure 1–7: International Symbol of Accessibility (ISA). Developed through a competition, the symbol is an abstract profile of a wheelchair user. It is static and passive looking because it portrays the wheelchair user reclining slightly to the rear.



Figure 1–8: Active Symbol of Accessibility. This symbol is similar in profile to the ISA, but it portrays the user in a more active posture, leaning forward.

Initially, accessibility was achieved in a haphazard manner. Figure 1–9 shows an early attempt to make the Everson Museum in Syracuse, New York, accessible. Accessible design like this was actually much like the conditions faced by African Americans in segregated public facilities in the United States, a separate-but-equal kind of status. This ramp is located at a little-used side entrance, not where most visitors would enter. Visitors who could not use stairs had to go out of their way to enter. Figure 1–10 shows another good example of “back-door access.” The building shown is a library at Delft University in the Netherlands. The only accessible entry is through a service door near the rear of the building. To gain access at this entry, a visitor must ring a bell, and a librarian will come to let the person in. However, entry depends on the availability of a librarian and poses security problems for the library. In both these cases, the solution to accessibility was considered legal at the time. In other words, it was not defined as discrimination. Although there is legal access, there are clearly still barriers.

Many well-meaning people are motivated to help disadvantaged people because they view them as objects of pity rather than to ensure social justice. For example, most religions espouse the virtue of helping the poor. While charity is a good value, it may have negative consequences if it is expressed in a way that continues to foster dependence rather than self-reliance and autonomy. Western civilizations have historically used charitable institutions to care for people with disabilities. However, when people with disabilities are confined to institutions, they are rarely found in public spaces or living in residential neighborhoods; thus, it appears that it is unnecessary to provide accessibility to the community outside the institutions. Not only is the inmates’ spoiled identity reinforced by the message that they cannot take care of themselves or participate productively in society, but the lack of accessible environments in the outside community also reinforces the belief that they are “incompetent” and cannot live like everyone else.

In the 1970s, much research documented the negative impact of institutional life (Sommer 1974). In the United States and northern Europe, advocacy led to moving people with disabilities



Figure 1–9: An early and unsuccessful attempt to make the Everson Museum in Syracuse, New York, accessible.

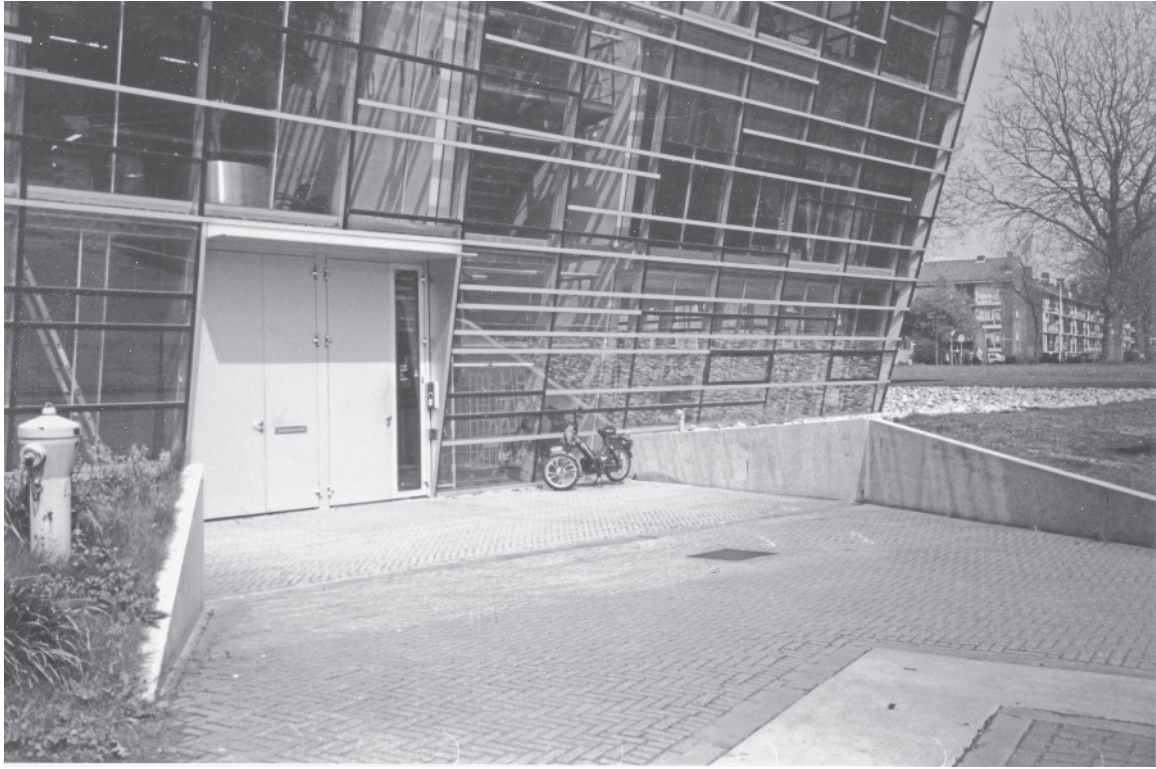


Figure 1–10: Central Library service entrance at Delft University, the Netherlands. The accessible entry is through this service door and requires a visitor to ring a bell.

out of institutions and into community housing (Lifchez and Winslow 1979). People with disabilities who lived with their families in a similar dependent state sought more independence as well. These two developments led to the Independent Living Movement, which began grassroots efforts to make communities and independent housing accessible. This movement has spread throughout the world. However, note that in some cultures, the obligation to care for a family member with a disability can be so strong that the idea that people with disabilities should live on their own is viewed negatively because it reflects badly on the family. Attempts in these countries to introduce initiatives to support self-reliance and alternatives, such as group living arrangements or independent living training programs, may be resisted.

It is important to realize that barriers to self-expression, especially barriers to the presentation of a positive social identity, still exist, even in countries that have pioneered in the advancement of disability rights. Figure 1–11a is a photograph of the Hall of Remembrance at the Holocaust Memorial in Washington, DC, constructed in 1993. The hall has stairs ringing the central space. Originally there was no way to get onto the lower level without using the stairs. This room is a holy place, where important events are commemorated—for example, memorial ceremonies for people who died in the Holocaust. Since the original design did not comply with accessibility laws, changes had to be made. Figure 1–11b shows the lift that was installed. Imagine being a wheelchair user coming to an event in the Hall of Remembrance. There is a good chance you would arrive late because you could not find an accessible parking place near the building. If



Figure 1-11: Hall of Remembrance at the Holocaust Memorial in Washington, DC. (a) Stairs surround the main floor level of the Hall. (b) A mechanical lift is installed on the stairs to provide access to the lower level.

you enter during a quiet part of the ceremony, all eyes would be on you as you use this lift, and its noise would ruin the spirituality of the event. You would become an unwanted spectacle, the object of pity and/or annoyance.

Figure 1–12 shows a picnic area. The sign reads: “Picnic area for handicapped only.” Why is the sign here? This picnic area is in a parking lot. The other picnic benches are scattered over the banks of the nearby river. None was accessible. However, the area pictured evidently turned out to be very desirable for all picnickers because it is conveniently located next to the parking spaces and on a stable, hard surface, which is good for children’s play. Therefore, many people who probably did not need an accessible table used it. When people with disabilities arrived, they had no place to picnic and perhaps complained. The authorities had to ensure that there would always be an accessible space for a person with a disability to picnic, so they passed a law and put up this sign to accomplish that goal. But if the entire picnic area had been accessible, there would have been no need for the sign because people with disabilities could go to any other of the picnic sites. Having even half of the sites accessible probably would have met the demand. Thus, in this example, the goal of nondiscrimination was subverted by well-meaning people to create an absurd situation where people with a disability are overly protected and privileged. This situation also reinforces the identity of being dependent and needing charity, in this case through the special protection of government.

Conditions in poor countries around the world are the most desperate for people with disabilities. In informal communities (shanty towns), they are often confined to their immediate living environment. Many people who cannot walk are forced to use a corner of their home for personal hygiene. If they have no family to help them, some may have no alternative than to beg on the street, using their disability to elicit charity. Since schools are inaccessible, they have no opportunity to improve their lives, even if they do have supportive family and friends (Tipple and



Figure 1–12: Sign at a picnic area. The sign reads: “Picnic area for handicap only. Local ordinance prohibits use by others!”

Coulson 2009). Needless to say, these conditions do not provide an opportunity to lead a healthy and dignified life.

Despite all the antidiscrimination laws and changes in public policy, examples of significant barriers exist in high-income communities, and the barriers to independence and autonomy in low-income settings are very severe. Social integration, acceptance, and understanding of disability have not yet been achieved in human civilization. There is a typical trajectory in architecture as societies develop more advanced perspectives on disability. The first stage is the architecture of exclusion, usually by neglect. The second is one of dependence through the development of institutions. The third stage is independence through the development of a legal framework and physical environment that eliminates discrimination and removes barriers to independence. We are now moving toward a new stage in many societies: the architecture of social participation, with the goal of equality in opportunity through universal design.

The result of the effort to eliminate discrimination, to make the world accessible and usable for all, is that unintended consequences are becoming evident. The picnic area described is a good example. A local law had to be passed to reserve the picnic area for people with disabilities. Why? Accessibility was desirable for all visitors. When we start to introduce accessibility into the community, even at a minimal level, we introduce conditions that seem to be good for everyone.

Figure 1–13 shows an underground subway station with an elevator. Even though the provision of elevators in subways was originally intended to make public transportation accessible to people with disabilities, it has proven to be a boon for many others—for example, parents with children in strollers and carriages, bicycle users, and travelers with luggage. In this station in Copenhagen, Denmark, the loading platform provides ample space for rush-hour crowds. The elevator has a very prominent location in the station. The glass enclosure provides a view and reduces entrapment by criminals. Note also the glass security barriers along the platform. Many new subway systems are adopting this design strategy. It protects visually impaired individuals from falling off the platform, but it also prevents people from committing suicide, prevents accidents during crowded conditions, and reduces the noise level in the station. All these are unintended consequences of providing accessibility. Two other good features of this underground station are the high ceiling and natural light, which reduce the negative feeling of being underground and improve visibility.

Another example is the unisex accessible restroom. This idea was originally developed to reduce the cost of making both men's and women's restrooms accessible in existing buildings. However, it was soon recognized that such restrooms were also very beneficial to many other people. For example, a mother can assist her son, a father can assist his daughter, or older people can assist their partners without embarrassment in these restrooms. Now we call these rooms family restrooms or companion restrooms, terms that symbolize the fact that the benefit to all has been clearly understood.

A final example of unintended consequences is the handicap parking permit. In many communities, a black market in these parking permits exists (Shoup 2005). Public officials have been exposed for influence peddling in issuing permits. Permits have even been stolen and sold to people seeking more convenient parking (Shoup 2005). The value of convenient parking is so great that people are willing to risk arrest to obtain a permit. In response to this demand, business practices are emerging to provide convenient parking for other groups, such as older people, pregnant women, and parents with small children.



Figure 1-13: Subway station in Copenhagen, Denmark. (a) View showing one entry and the skylight, which, in conjunction with light from the two stairways, floods the underground station with light. The sign provides real-time arrival information. (b) View showing the glazed elevator, woman with baby stroller, and the other entry with escalator and stairs.

More and more people are starting to find accessibility touching their lives. Automatic doors are very convenient if you are carrying a package. Ramps and curb ramps are magnets for skateboarders. Elevators are a blessing when we are sick or injured. The disability rights movement has moved society in a direction that has broad implications for everyone, not just people with disabilities and their families. It led to the development of universal design, also known as design for all in Europe or inclusive design in the United Kingdom. Ron Mace, an architect with a disability, is often credited with the invention of the concept (Mace 1985). This new paradigm for removing barriers is radically different from the old access model.

Today, many writers use the term “universal design” as a substitute for “accessible design” without understanding its significance or how the terms differ. The goal of universal design extends beyond eliminating discrimination toward people with disabilities. A universal design benefits everyone or, at least, a large majority. Moreover, to avoid stigma, it engages the aesthetic realm as well as the pragmatic because it has to appeal to everyone. Universal design is about dealing with barriers as artists or scientists would. It demands creative thinking and a change in perspective. It is not sufficient merely to apply design criteria in accessibility regulations in a mechanistic way. Often a change in perspective is needed.

There have always been designers thinking creatively about removing barriers. The Guggenheim Museum in New York City is an early example of universal design (Figure 1–14). We usually think of building ramps to connect two levels, but Frank Lloyd Wright had a new

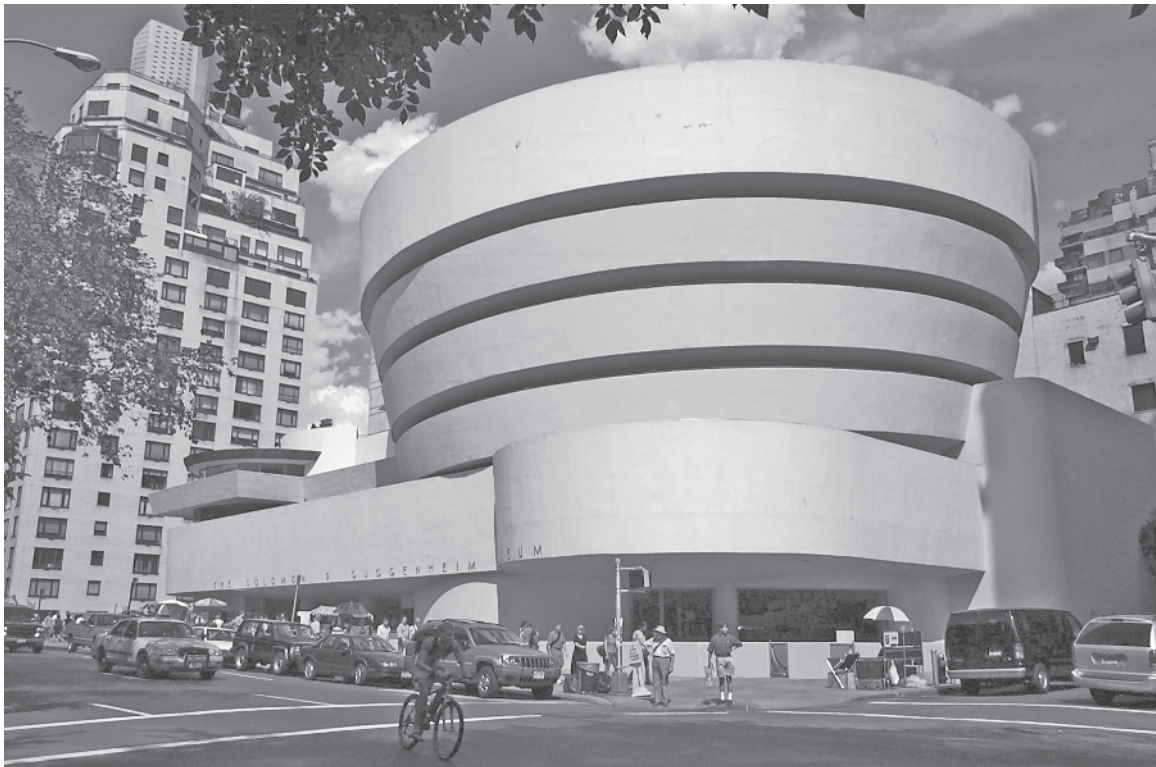


Figure 1–14: Guggenheim Museum, New York, NY. Designed by Frank Lloyd Wright, the museum is an early example of universal design. The museum’s interior contains one continuous ramp from the top level to the lobby.

perspective on ramps. He ramped the building itself. Reportedly, he was inspired by his dislike of museums that took a great deal of effort to visit. He thought every museum visitor could benefit by taking the elevator to the top of the building and then effortlessly gliding down the ramp to observe the artwork along the way (Pfeiffer 1991).

Summary

Barriers are a part of everyone's lives. Artists use barriers as a subject for their work in extremely creative ways. Scientists also focus a great deal of creative effort on barriers, either by finding a breakthrough that advances knowledge to new levels of understanding or by learning the limits of technology. The work of artists and scientists can be a source of design inspiration. Designers cannot avoid dealing with barriers because they are an essential part of the built environment and virtual spaces. Thus, thinking about barriers creatively should be an important part of design, as it is in art and science.

Creating enabling environments is an important ethical goal of designers. Creating unnecessary barriers to independence and social participation should be avoided for the benefit of all. Spatial orders that result in limiting the potential of human beings can damage social identity, stifle the quest for autonomy, and increase dependency at great cost to society. Barriers are encountered at many levels of human experience, including the physical, the sensory, the cognitive, and the communicative dimensions. Throughout this book, we explore how universal design can address these complex issues. In the process, we show how the universal design philosophy can be as much of a creative challenge as other aspects of design, such as sustainability and affordability.

Although the idea emerged from the disability rights movement, this philosophy has implications for many other groups; in fact, it has universal benefits. It is perhaps one of the most profound ideas in the contemporary history of design. Many precedents, such as the Guggenheim Museum, are well known but have not been identified as precursors to universal design thinking. Through examples and case studies, we look to the past to demonstrate the power of universal design, but we study the present and future to imagine where this design philosophy can lead.

Review Topics

1. What is a barrier? Describe a barrier in your everyday environment in detail using a concrete descriptor, such as "barrier to perception." Describe why it is a barrier.
2. Define "privacy" and "territoriality." Identify and describe how they relate to sociospatial order.
3. What are the origins of universal design? Explain how universal design differs from accessible design.

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