VISUAL ACCESSIBILITY

Seminar Course

Universal Architecture in the designer's eye – accessibility, usability, universal design and the UN CRPD

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18 december 2016

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Buildings are for everyone

Inadequate design in our built environment and public space can sometimes literally withdraw from the eye. Feelings of discomfort, accidents and getting lost are indicators that there is something going wrong. In many cases users with disabilities will perceive poorly designed spaces earlier as a problem because they cannot use the space as it is supposed to. These critical situations should be addressed by designers, because with just a little more effort during the disign phase there is much profit to be gained. This essay creates awareness on the problems that still occur in our society within the spectrum of visible accessibility and discusses the different perspectives from a user and the designer eye. Although it is of great importance worldwide, this essay focusses mainly on the national scope in the Netherlands, while taking the international scope as a reference.

Just three days after the opening of the 'Rijksmuseum' in Amsterdam (Figure 1) - after accidents happened of people falling on the stairways in this museum - these were adapted. All of the white stairways in the atrium -which is colored white as well - were getting a dark signage on the edge of each stair and extra handrails. During the same period several small poles with a maritime look were placed in Amsterdam on the shore near the waterside in order to prevent cars from driving there (Figure 2). A few weeks after this placement a young women crashed into one of those poles with a scooter. She gained severe injuries from this crash as well as her passenger, and three days later she died of her injuries. These are examples of just a few of the many accidents that have happened in public spaces by which only the individuals have been affected. Those accidents could have been prevented if the spatial design had been clearer (Schepers & Brinker, 2011, Volume 54). There is more going wrong in confusing public spaces than meets the eye. For example 'to get lost' is one of those inconveniences for people who are not familiar in that place. People get lost if the place is not 'self-explaining' and the signage is hard to find or hard to read. You will only feel safe in an environment when it is clarifying and accessible (Luten, 2008), when you are able to find your way easily and you have time to get an overview of the obstacles and how to overcome those. This feeling of security is mainly influenced by visual cues, one of the most accurate sources of spatial recognition, even for those with limited visual capabilities.

Therefore you can call the built environment 'visual accessible' when the user is able to find its way safely by using the visual cues, being able to stay there and leave in a safe way.

Figure 1. Stairway in 'Rijksmuseum' Amsterdam, The Netherlands, without signage (upper left image) and with signage. (upper right image) (Schreibers, 2013)

Figure 2. Poles placed on the Veemarktkade in Amsterdam, The Netherlands. (Unknown, 2013)

Figure 3. The cover of the documentary ' The School as City, Herman Hertzberger'. (Unknown, 2013)

Is there a right to visual accessibility?

The visual accessibility is not to be taken for granted in our built environment and cannot always be enforced through laws and regulations. The visibility of obstacles is quite often subservient to the intended aesthetic appearance of the space. This was probably also the case in the 'Rijksmuseum' in Amsterdam, where the color of the stairways was not to be distinguished from floor below it, and those poles which were hard to see in the dark (Unknown, 2013). Often the aesthetics of the design is being taken more seriously than the safety of the place and the situation that is created.

In a documentary (Figure 3) about Herman Hertzberger (Vall & Vos, 2012) 'De school als stad' – freely translated as *'The School as a City'*, the architect was confronted with many of the incidents that had happened in a school designed by him. He states that it was a big mistake to think that everything always had to be made safe. Because in his opinion this was not the way to prepare the children for the real life of their future. This opinion suited to the philosophy that school buildings should be a challenge for their users. But this vision also assumed that the users of this particular school building (the children, the personnel, children's parents and grandparents, and others who work in the building) have no disabilities. This was the case back in 1959, when Hertzberger announced his vision (Vall & Vos, 2012). People with disabilities often lived, back then, in specially designed institutes in the outskirts of a city or village and did not take part in schooling in regular buildings.

During the 1960s and 1970s most European countries abolished institutions and aknowledged the rights of people with disabilities. Nowadays the awareness grows on the fact that this separation is discrimination and that we should all be able to take part in society in the same buildings. We are realizing that we should take in consideration all possible users during the design of a building and space. This reversal has made it possible through the many communities that represented the interests of people with disabilities such as the UNCRPD (Convention on the Rights of Persons with Disabilities). In the United States this has resulted in an anti-discrimination law through which the accessibility of many buildings for people with a wheelchair has improved drastically. There is a worldwide consensus that people with disabilities have the same rights as anyone else in the welfare society. In 2007 this has been confirmed by the United Nations in the 'Convention on the Rights of Persons with Disabilities'. The ninth article of this agreement considers accessibility, which goes as the follows (United Nations, 2006):

"**1.** *To enable persons with disabilities to live independently and participate fully in all aspects of life, States Parties shall take appropriate measures to ensure to persons with disabilities access, on an equal basis with others, to the physical environment, to transportation, to information and communications, including information and communications technologies and systems, and to other facilities and services open or provided to the public, both in urban and in rural areas. These measures, which shall include the identification and elimination of obstacles and barriers to accessibility, shall apply to, inter alia: a. Buildings, roads, transportation and other indoor and outdoor facilities, including schools, housing, medical facilities and workplaces;*

b. Information, communications and other services, including electronic services and emergency services.

2. *States Parties shall also take appropriate measures to:*

a. Develop, promulgate and monitor the implementation of minimum standards and guidelines for the accessibility of facilities and services open or provided to the public;

b. Ensure that private entities that offer facilities and services which are open or provided to the public take into account all aspects of accessibility for persons with disabilities;

c. Provide training for stakeholders on accessibility issues facing persons with disabilities;

d. Provide in buildings and other facilities open to the public signage in Braille and in easy to read and understand forms;

e. Provide forms of live assistance and intermediaries, including guides, readers and professional sign language interpreters, to facilitate accessibility to buildings and other facilities open to the public;

f. Promote other appropriate forms of assistance and support to persons with disabilities to ensure their access to information;

...)

The scope of this article fits with the 'participation society' the government of the Netherlands is aiming for, mentioned during their 'Budget Day' in 2015. However the fear does exist that the ratification of the UN agreement will not lead to the necessary laws and regulations needed on a more national/local scale. After all, the same government is working on a new law for the built environment which will help simplifying the current laws and regulations.

This law on the built environment will soon be finished while it is still uncertain if and how will be referred to the ratification of the UN agreement. It is thus still questionable if there will be extensions on this law and legislation considering the accessibility of buildings and the built environment. Also uncertain is how much of the current laws and regulations will survive these deregulations on the built environment. Thus we will have to assume that only through jurisprudence the visual accessibility of the built environment can be enforced. Therefore must be clear what the minimum requirements for a visual accessible environment are and how to create and maintain such an environment. This essay creates the awareness of the problems that still occur in our society within the spectrum of visible accessibility.

Who benefits from visual accessibility?

When you take a good look at many public buildings and spaces it seems to be that their designers used to assume that people with visual impairment were not able to use the visual information of their environment at all. Which led to the situation that those users were designated to a closed system of audio and tactile cues. However, according to the WHO ('World Health Organization') 75% of the population has a visual impairment, 'low vision', and two third of the blind people still has visual capacities. More than nineteen percent of the people with a visual impairment can thus profit from visual incentives. It has to be said that it is a big misunderstanding to assume that all people with a visual impairment need a guide dog or any other tool to help them. Even a lot of visual impaired people are able to ride a bike and walk without any guidance.

The second big misunderstanding is that people without a visual impairment can capture their surrounding in a glance. With every glance a person is only able to see precise within the center of their focus point. Outside this spectrum the sharpness of the visibility decreases and within 20 degrees outside of the center the visibility has decreased as much as what is defined by the WHO as blind. So for everyone, also those who can see very well, obstacles and the differences in height in an unfamiliar space must be evident, even when not looking directly towards it. This also counts for signage that has to be easily found in an unfamiliar space. Objects can only be detected within the periphery of our sight when they are big and or stand out because of their contrast with its surroundings. For example the black stripes on the stairs in the 'Rijksmuseum' Amsterdam and signage for wayfinding such as the big yellow signs at the airport Schiphol of Amsterdam (Figure 4).

The conclusion is that everyone benefits from a visually accessible built environment and that it is not only necessary for those with visual impairment. This awareness is gaining increasing interest amongst designers. Before this awareness people were used to blame themselves when making mistakes in unclear situations, while now it is the designer that is to blame and has the capacity to improve the situation for its users.

Figure 4. Signage at the international airport Schiphol in Amsterdam, The Netherlands. (Edenspiekermann, 2015)

Wayfinding & Architecture

Given the impact of wayfinding on human psychology, occupant satisfaction, health, long-term performance, and the financial bottom line, inattention to wayfinding reduces the inclusiveness of buildings for everyone. Understanding a few basic principles of architectural wayfinding design can help designers to enhance building performance and to provide more inclusive solutions. Good architectural wayfinding design is important to universal design because it facilitates user access, increases satisfaction, and reduces stigma and isolation of users with disabilities. It reduces the confusion of visitors and mistakes by employees, saving time and money and preventing accidents. It also reduces stress, boosting health, and productivity (Evans and McCoy, 1998)

In today's complex maze of urban structures, wayfinding is no longer simply a matter of putting up directional signs, it is multi-faceted problem that requires sharp design skills. The book *'Wayfinding'* (Figure 5) spells out the principles of wayfinding and applies them to architectural design. beginning with spatial, orientation, and perception factors, the book shows how well-designed routes and destinations must integrate a wide range of stimuli - graphic, verbal, auditory, and tactile. Plus, convenient checklists show how to prevent potential wayfinding problems in the design stage and to troubleshoot them in existing structures. Supported by numerous real-life examples and hundreds of lively illustrations, this book is a complete guide to spatial direction and logical orientation in buildings and public spaces - jam-packed with proven techniques for helping people find their way through today's confusing world. (Arthur & Passini, 1992)

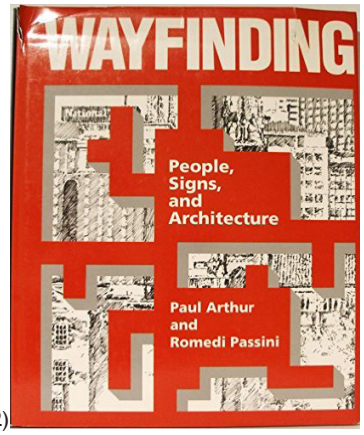


Figure 5. Book about Wayfinding from 1992. (Arthur & Passini, 1992)

Critical situations

Architects or designers rather dont like to work with a long list of laws and regulations in order to get an approval for their design. In the documentary about Herzberger 'De school als stad', the architect even claimed a warning for too much of these regulations. *"After a while you don't even need architects anymore. A machine could be able to make a calculation of the elements needed for the design, with a possible horrible result"*, says Herzberger.

This essay tries to contradict this pessimistic opinion about laws and regulations, which in my opinion are of great importance to follow international guidelines as those that are stated by the International Organization of Standardization (ISO). ISO states minimum requirements that make the built environment accessible and usable for everyone.

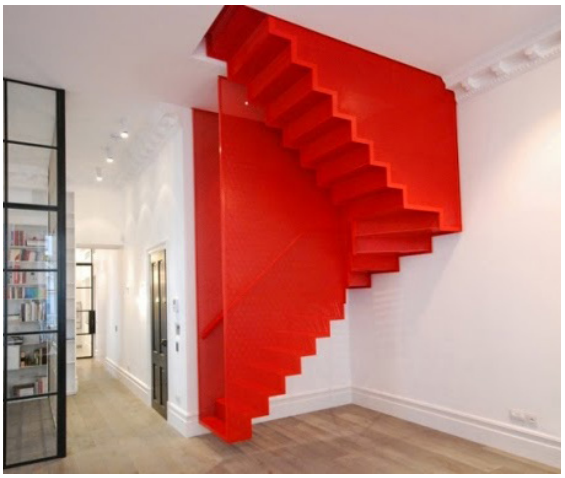
These guidelines mainly focus on 'critical situations', situations whereby the user is in danger, is impeded or has to make a choice.

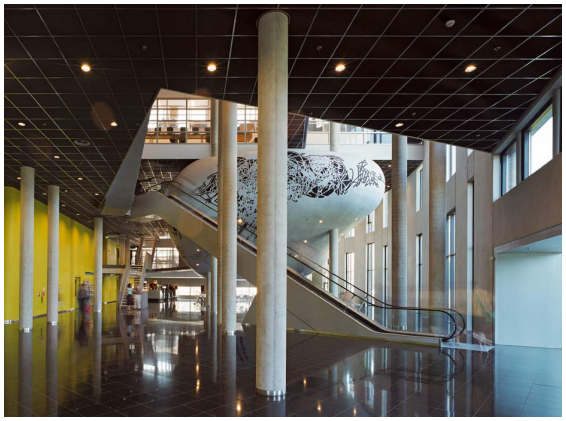
The images added to this essay display examples of critical situations (Figure 6 - 14). It has to be noticed that pictures sometimes have a specific angle of perspective. For example the stairway picture (Figure 1) is taken from above by which it exemplifies the need for signage on its stairs, - which is actually the users view - while architects are used to picture a stairway from below to emphasize the aesthetics of the design.

Figure 6 & 7. Images above:

The architect Jeanne Dekkers has tried here to create the effect of a natural icerink. The effect is actually disorienting because of the reflection on the floor. (Meier, 2016)

Figure 8. Image below. Disorienting stairway, because of the overall use of red. (Ashraf, 2016)





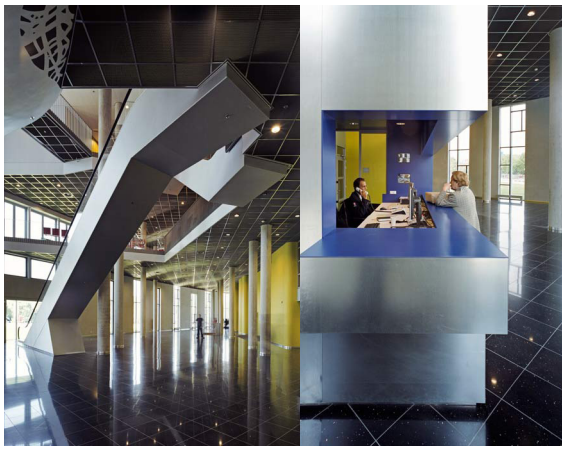


Figure 9, 10 & 11 Images above.

The Dutch architect Jeanne Dekkers has tried here to create the effect of a natural ice rink in the entrance hall of the OZW Vrije Universiteit in Amsterdam, The Netherlands. The effect is actually disorienting because of the reflection on the floor. (Dekkers, 2016)

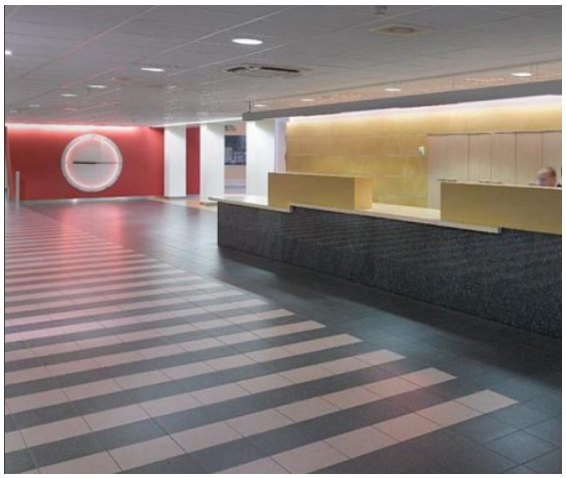


Figure 12, 13 & 14. Images above and lower left corner.

The interior including the entrance hall of the VU-Medical Center in Amsterdam, The Netherlands, is designed by S&D architects. They emphasized the walking routes by the stripes on the floor to guide their visitors through the building towards their destination.

Images above

(S&DOntwerpers, Bronovo Ziekenhuis Kinderafdeling, 2012)

Image left

(S&DOntwerpers, VUmc, 2000-2004)

Signage

The ultimate test of a building is the convenience with which the user is able to find his/her way to their destination. This is the specific task of companies that are concerned with 'wayfinding'. They take a look at the surroundings through the eyes of the user/visitor of that specific place or building, through which they determine the necessary signage needed. The 'wayfinding' designer has to take into consideration that the challenge for a user to find his/her destination may not be too challenging, because apart from the practical difficulties it also causes stress problems and thus affects the ambiance and efficiency.

People with a high level of stress are less capable of optimal functioning. Stress leads to inefficient ways of scanning your surroundings when finding your way, which may lead to overlook dangerous obstacles. Thus it is important that a situation is "easy to read" which can also be translated as 'self-explaining'. The layout, the order and rhythm of the spaces, and other visible design features are determinative for the intuitive and associative movement of their visitors. When, in an ideal situation, from the beginning on, 'wayfinding' is taken in serious consideration, then probably less signage is needed or needs to be added to the design afterwards. The architect can also use the guidelines of 'wayfinding' as an extra design tool, instead of seeing this as a threat to the desired aesthetics. In time the order of functions in a building can change, by which the readability of the spaces also changes and the 'wayfinding' designer is again needed.

There are multiple factors that cause stress, and our bodies react to these in a variety of ways. Studies have shown that anxiety raises the amount of cortisol that our bodies produce. Because this hormone is responsible for suppressing our immune systems, we are at a greater risk for illness when we are experiencing stress. Of course, hospitals are less than ideal environments in which to have a weakened immune system. Increased blood pressure and heart rate also result from stress, as does an altered emotional state. Ineffective wayfinding signage serves only to exacerbate these problems. Easing worry with well-designed systems will lessen the chance that visitors will become sick or agitated (ASI, 2012).

Other stress-related issues concern the manner in which people respond to directional information. For example, consider someone who is unfamiliar with his or her surroundings. No matter the location, he or she feels at least a little uncomfortable if disoriented. But when that location is a hospital where stress levels likely are already increased, the discomfort may be intensified. And the more stress that person feels, the less directional information he or she will be able to process. This is especially true if the information is presented in an ineffectual manner. Badly designed wayfinding signage induces frustration and anger – and rightfully so. It also leads to wasted time if visitors have to ask the staff for directions. All of these problems reflect poorly on the healthcare facility and can affect its reputation and profits in the long run.

An example to reduce stress when entering the rooms is the Children's Hospital in Michigan (Figure 15). The intent of the interior design theme is to create a fun distraction for the children and staff who are under pressure and stress in a critical care environment. ASI provided design solutions for the interior signage, including custom designed artwork. ASI also helped select the fish and seaweed artwork for the MRI Suite, as well as incorporating the seahorse, starfish and whale into the Emergency Department signage. The use of these creatures inspired the naming of the treatment "pods" and the images used in their tile flooring. For the upper floors of the hospital, ASI worked directly with the hospital staff to identify and recommend bright, childlike colors for the signage. The finished solution use a color theme similar to the colors found in a box of crayons, with each level highlighting a different crayon from the box. The colors used include red, magenta, yellow, teal, blue and purple and complement the interior design of each floor (ASI, 2012).

In addition to obvious concerns for safety, convenience, universal access and wayfinding, the designer is also concerned with the route as a pleasurable experience: a sequence of spatial settings through which the traveller is attracted to move. Designers must pay attention to the creation of an engaging and varied setting; the visual, aural, or tactile characteristics of materials; the light and heat reflectivity of surfaces; and the variety of sounds and other sensual experiences provided by different spatial and ground patterns, textures, colors, sounds, and smells. Shade needs to be provided in summer and shelter from wind and rain in winter. The experience of atmosphere, the play of shadows, the textures of plants, the movement of nearby water, and the activity of birds or other people are just as important to a satisfying pedestrian experience as the convenient connection to an intended destination. All these are considered in a safe, clear, comfortable, austhetically rich, total experience. Walking or biking to be experienced as much for the pleasure of being in the landscape as for circulation as a necessary activity. (Murphy, 2016)

Figure 15. Modular interior signage solution for Children's Hospital of Michigan – Detroit MI (ASI, 2012)

The future of visual accessible design

The subject of accessibility and usability of our built environment is still subservient unfortunately in many schools and practices to aesthetics, technique, innovation, constructional principles, and other subjects within the design profession. After all for example ergonomics and related subjects are no obligated courses in architecture education. Until now the visual accessibility of our built environment keeps ending up in the discussion after completion. Architects in the United States are concerned with designing for disabled people since the early fifties. This has led to an extra impulse in the nineties when the architect Robert Mace amongst others (Mace, R.L.; Story, M.F.; Mueller, J.L., 1998) introduced 'Universal Design' as a way of creating a bridge between the gap of accessibility for everyone and aesthetics.

There is a growing need for visual accessible design as a result of the growing elderly population with a huge variety of impairments, and who will keep on visiting public spaces as well as everyone else. This is also one of the arguments why it is necessary to take the international agreements in serious consideration, since it represents the quest and need of these people. Architects in the Netherlands will definitely need to get more informed about with Universal Design, like they are already doing in the United States and Scandinavian countries.

This being said the problems around visual accessibility should be discussed in the very beginning of the design process. Nevertheless tensions will occur during the design process between parties. Aesthetic and conceptual perceptions of the architect can simply contradict the wishes of the client who probably strives for a high accessibility and usability of the building for its users. In contrast to what was quoted before from the documentary about Herzberger, he does think that: *"Architects need resistance. I have been preconditioned by this and I honestly think that I would not be able to make a better design without this resistance."* (Vall & Vos, 2012). Thus we all benefit from the laws and legislation to improve our designed environment, accessibility for all.

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