



research

**community center
for the blind and
visually impaired
in Frankfurt**

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academic year:

2021/2022

Using other senses

All users explore and experience buildings with the sensory apparatus available for them. In the case of blind and visually impaired users, they do so, primarily through tactile, auditory, olfactory, and kinaesthetic information gathering. The principles for designing "with the blind in mind" focus on the recognition and offer of non-visual spatial clues.



Sound

To a blind person, sound is a potentially helpful and positive source of information, but one that may sometime cause confusion. Auditoru clues or beacons should be provided in and around buildings to aid orientation and warn of hazards. The common sounds within the building also provide people with clues, and great care should be taken not to suppress or eliminate them totally.



Aromas

In outdoor areas, fragrant plants can improve the environment for all, and provide pleasure and orientation clues for people with poor sight. Plants produce fragrance from leaves and steams, as well as from flowers, and the tactile qualities of various plants can also be used for landmarking and wayfinding. Aroma producing devices can also be used as wayfinding clues if some thought is given to different aromas in different locations.



Other sensory input

The movement of air and the temperature of air currents are also important clues as to what is going on in an environment. Kinaesthetic information derived from the faculty which precives voluntary motions of the body can be as important as sounds and aromas.

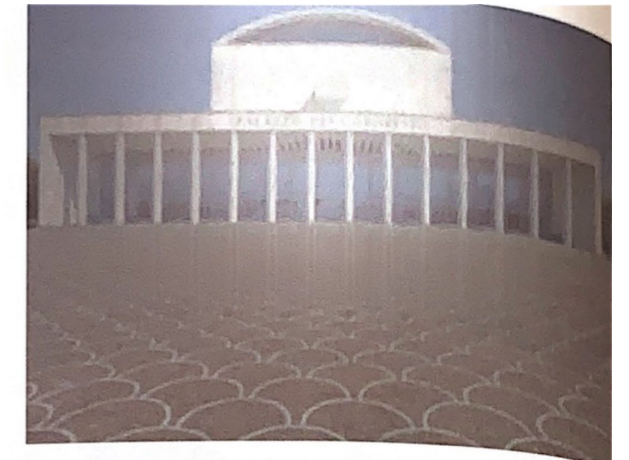


Only five percent of those who are visually impaired have no sight at all. That's why it is important not to design an exclusive architecture only for blind people, which may enforce segregation and disempowerment. Instead, inclusive design principles should be enforced to provide an environment empowering and integrating all people.

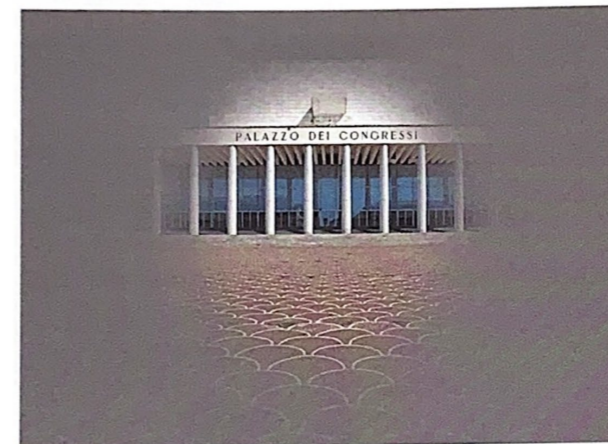
Types of visual impairment



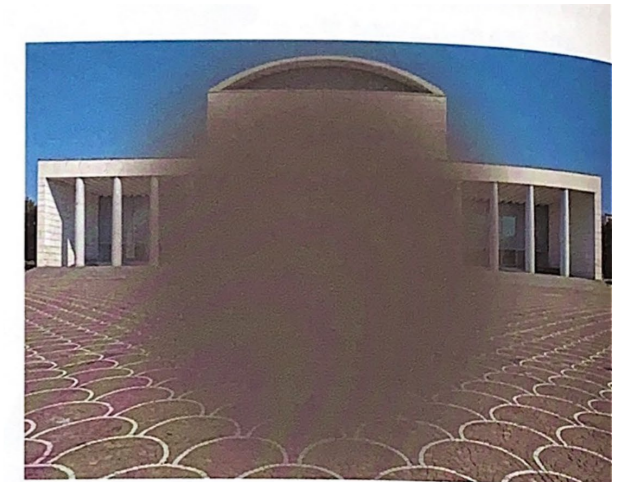
Typical field of vision of a person with normal eyesight



Cataract



Retinis Pigmentosa



Macular degeneration (yellow spot)



Glaucoma



Retinopathia diabetica

01 Research - norms and requirements

01.1 Planning requirements

Different types of visual impairment require different design approaches. The list below shows base recommendations for designing for the visually impaired, blind, and both blind and deaf users.

VISUAL IMPAIRMENT:

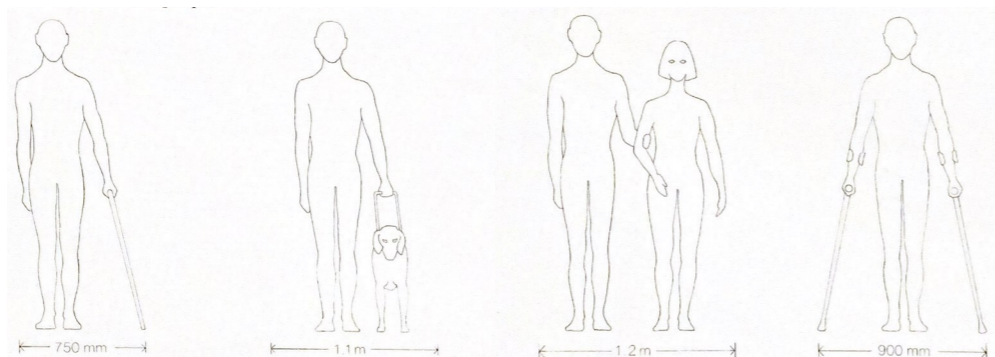
- space should be bright and lit in a glare-and shadow-free manner,
- potential safety hazards (such as steps and thresholds) and orientation aids (such as signs, switches and handles) should be clearly recognisable through the use of contrasting colours,

BLINDNESS:

- potential safety hazards (such as steps, thresholds and sharp edges) should be avoided,
- orientation should be eased by using tactile components (such as wayfinding floor coverings),
- shatter-proof glass should be provided for the spaces (in case of fully glazed doors etc.),
- acoustic signals should replace visual signals (ex. elevators with acoustic signaling),
- balanced acoustics should be provided for the space,

BLINDNESS AND DEAFNESS:

- potential safety hazards during motion should be avoided (such as steps, thresholds and sharp edges),
- provide orientation aids by means of tactile components and guidance systems (varying wall and floor textures and coverings, and easily recognisable furniture),
- provide smooth, easily cleanable wall surfaces that create hygienic conditions and reduce the risk of injury (rough plaster should be avoided),
- provide additional orientation aids by means of "sensory islands", ex. using plants in corridors,



source: "Construction and Design Manual - Accessibility and Wayfinding" by Philipp Meuser

SUMMARY OF KEY INTERIOR DIMENSIONS:

Blind person using cane	width 750 mm
Blind person plus guide dog	width 1,1 m length 1,5 m
Blind person plus sighted escort	width 1,2 m
Blind person with crutches	width 900 mm
Doorways	clear opening width 800 mm
Corridors	clear width 1,2 m
Stairs:	
Riser	150 mm
Going or tread	280 mm
Edging strip	50 mm wide / full width step
Nosing	50-65 mm on tread and riser across full width of step
Handrails:	
Height	900 mm above pitch line to centre line of handrail
Diameter	45-50 mm
Lenght	300 mm horizontal beyond top and bottom step
Tapping rail:	100 mm minimum 200 mm maximum above ground level
Edging or upstart:	150 mm minimum with handrail 100 mm if no handrail
Eyelevel:	1,4-1,6 m above ground level
Visibility panel / for highlighting:	150 mm square or similar surface area
Overhead clearance:	2,1 m minimum 2,5 m optimum
Reach from sitting position:	1,3 m distance height 400 mm sideways 250 mm backwards
Stairs:	maximum rise between landings 1,2 m

drawing 2: dimensions + summary of key interior dimensions
source: "Building Sight" by Peter Barker, Jon Barrick, Rod Wilson

01 Research - norms and requirements

01.2 Layout

While designing a people-friendly functional layout, it is essential to break down unnecessary barriers and exclusions. Here are some guidelines that used can help achieve inclusive design.

CIRCULATION AREAS:

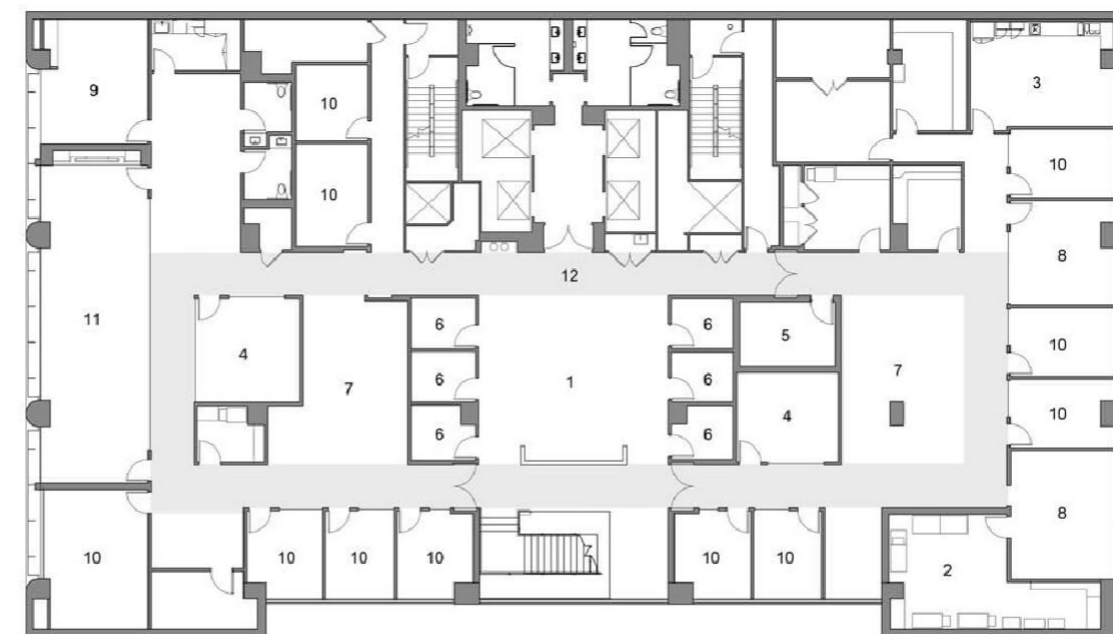
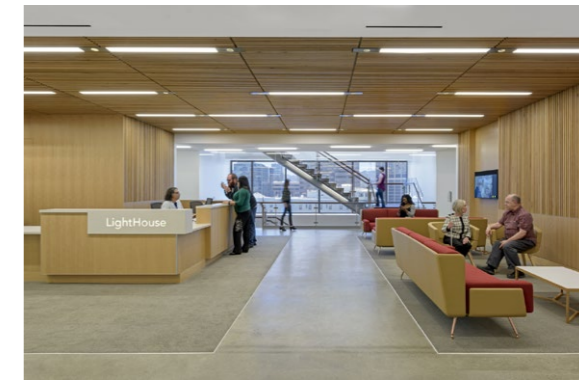
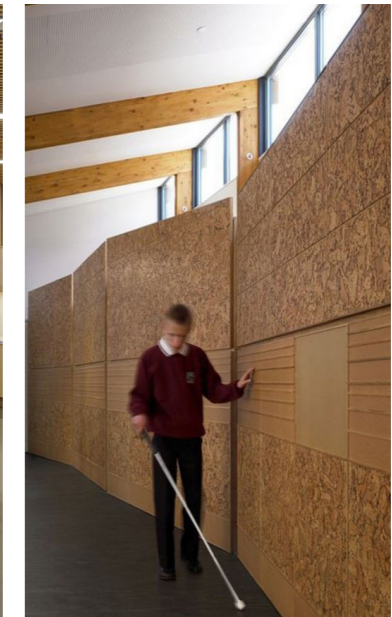
- reception area close to the entrance,
- essential services, such as toilets, lifts, staircases, should be grouped together,
- doorways to essential services should be off a central circulation area or adjacent corridors,
- acoustics should be carefully planned and controlled to reduce background noise,
- large areas should be broken down into smaller units by varying elements such as light fittings, furniture or floor coverings,
- different colour scheme should be used for different areas,
- internal support columns and pilars shouldn't be positioned in interior circulation areas unless they are deployed as orientation landmarks,
- corridors and halls should be kept as short as possible,
- the end of the corridor needs to be highlighted - **good colour or tone contrast**,
- constant directional changes or even minor deviations from straight lines may lead to the disorientation or distress of visually impaired person,

WINDOWS:

- windows positioned at the end of corridors or passageways can cause glare problems, which may be reduced by using tinted glass, anti-glare treatment or some form of blind,
- decorative or informative sign should be used to highlight full-length or picture windows - to avoid people walking into them,

FLOOR COVERING:

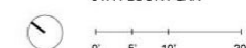
- floor covering should **contrast** with the walls so that the boundary of the floor is clearly visible,
- should be of a matt finish - to **avoid glare**,
- in very large areas, "walkways" can be created by the use of a floor surfacing with different tactile and colour - **contrasting characteristics**,



LEGEND

- | | |
|--------------------|----------------------------------|
| 1. RECEPTION AREA | 7. OPEN OFFICE |
| 2. GRAPHICS ROOM | 8. SHARED OFFICE |
| 3. BREAK ROOM | 9. MEETING ROOM |
| 4. CONFERENCE ROOM | 10. PRIVATE OFFICE |
| 5. AUDIO ROOM | 11. BOARD ROOM |
| 6. TRAINING ROOM | 12. CONCRETE CIRCULATION "TRACK" |

9TH FLOOR PLAN



drawings 3-7: interior pictures + floor plan
source: <https://www.cavagnero.com/project/lighthouse-for-the-blind-and-visually-impaired/>

01 Research - norms and requirements

01.3 Visibility & Lighting

Lighting is a vital aspect of designing for the visually impaired, who might need between 50 percent and 100 percent more light than sighted users. The same applies to visibility, which can be improved significantly by contrast implementation.

VISIBILITY:

- key features of the building have to be visually accentuated (ex. columns in circulation areas should be coloured to stand out from the background; same with handrails, stair nosing, doors, glass panels, light switches, etc.),
- **color and tone contrasts** - most effective means of improving visibility

LIGHTING:

- glare should be avoided at all costs,
- light should be **evenly distributed** with no dramatic changes when moving from one area to another,
- where appropriate, the lighting level should be controlled by dimming or switching,
- **avoid: glares, dazzles, optical illusions, heavy shadows,**

RECOMMENDATIONS ON TASK ILLUMINANCE:

Location	Maintained illuminance (lux)
Entrances - halls, lobbies, waiting rooms	200
Enquiry desks	500
Circulation - corridors, lifts, stairs	100
Lounges - communal	100-300
Kitchens - food preparations	150-300
Bedrooms	100
Offices - general	500
Computer work stations	300 - 500
Filing rooms	300

theory
source: "Building Sight" by Peter Barker, Jon Barrick, Rod Wilson



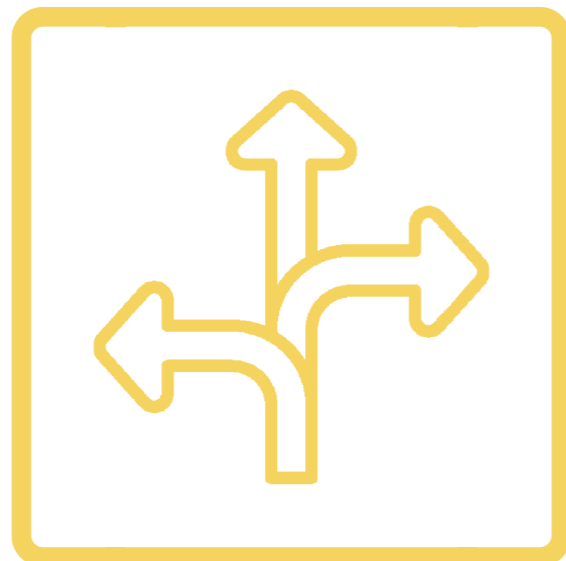
drawings 8-11: interior photos
source: <https://archello.com/project/anchor-center-for-blind-children>

02.1 Summary design principles

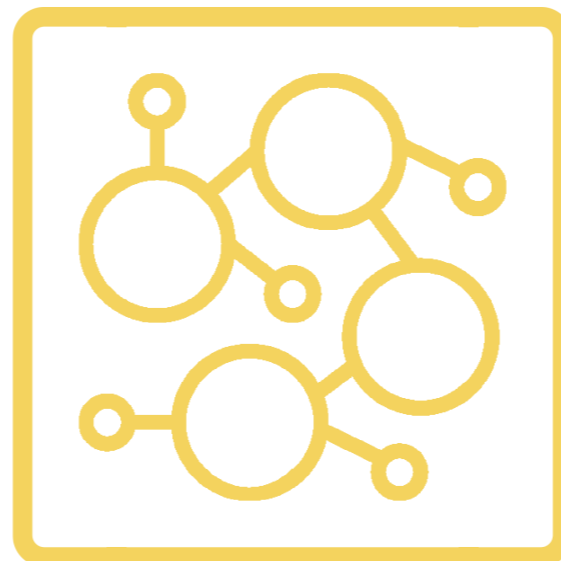
Designing With The Blind In Mind

Barrier-free architecture means that the world we create ourselves must be designed that it is open to all people, irrespective of their physical condition or age, without the need for assistance and without restrictions.

The goal is to create a people-friendly building, which allows non-stigmatized freedom of access to all.



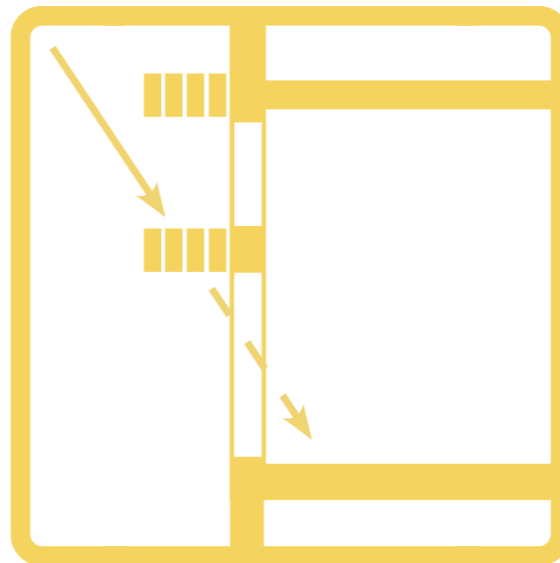
easily understandable layout



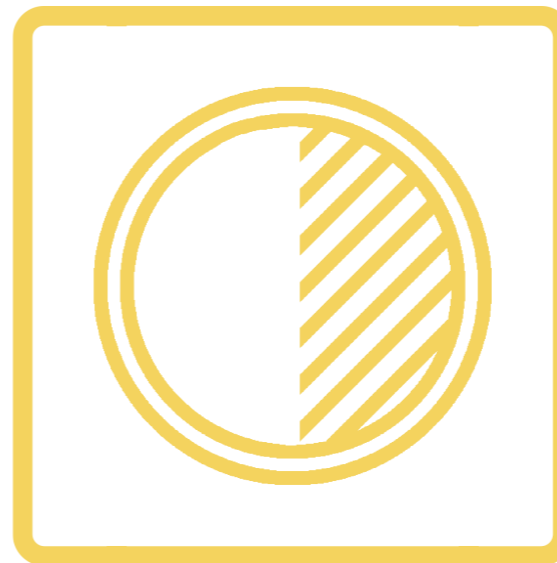
logically grouped functions



generous circulation spaces



evenly distributed light



good color and tone contrast