UNIVERSAL DESIGN:

Dealing with the Demographic Impact in German Cities today

Diseño Universal: El impacto demográfico en las ciudades alemanas actuales.

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ABSTRACT

Today we live in a world of global complexity, in which economical, political, cultural, environmental, educational and communicational interweavement exists, mainly due to the technical progression of our information and knowledge society which is decisively responsible for our daily life. The effects of globalization go beyond economical and political interests. Social aspects that affect the independence and orientation of each individual life have become more relevant and need to be taken into account, especially in the planning of interior and exterior spaces. Due to demographic changes world-wide, it will be important to integrate new strategies and criteria into planning urban processes.

Key words: Universal design, disability, city.

RESUMEN

Actualmente vivimos en un mundo de complejidad global, en el cual existen conexiones económicas, políticas, culturales, ambientales, educacionales y comunicacionales, principalmente debidas al progreso técnico de la información y al conocimiento de la sociedad la cual es responsable de la vida diaria. Los efectos de la globalización van más allá de los intereses políticos y económicos. Los aspectos sociales que afectan la independencia y orientación de cada individuo son muy importantes y necesitan ser tomados en cuenta, especialmente en la planeación de espacios tanto internos como externos. Debido a los cambios demográficos alrededor del mundo, debe ser importante integrar nuevas estrategias y criterios en los procesos de planeación de las ciudades.

Palabras clave: diseño universal, discapacidad, ciudad.

Introduction

Globally existing structures need to be revised, provided this is not happening already. A long-term reorientation is required in order to respond to the changes in society. This leads to a general transformation of consciousness, aiming to integrate current individual needs in everyday life, for example by ensuring that building procedures allow independent participation in social life for all people equally.

For this it becomes necessary to induce an open discussion about existing social structures and requirements as well as planning and building provisions in order to advance in these processes of change, indeed going beyond borders and continents. Today our global world can support and promote this discussion where the exchange of knowledge about the existing capacity in different countries has become so easy. In this, a comparison is possible, allowing global learning, implementing structurally relevant changes quicker and easier. This allows us to compare current problems with our neighbouring countries, analyze and convert into new solutions, for example by examining the modification of public interaction space, specifically for people with mobility limitations[1] or by exploring new design concepts for the structural execution of housing for dementia patients (Germany has developed new concepts)[2].

In the long run, an open discussion can implement new standards, which should lead to changes. One example is the global dispersion of basic legal principles for barrier-free design and construction. In the sixties it hesitantly became a topic in the USA and only by 1990 was it legally founded in the "Americans with Disabilities Act" (ADA). Particularly looking at demographic changes, which will lead to a significant development in Germany and Europe within the next 10 years, as well as effecting countries with a major young population in about 25 to 30 years, it is inevitable to seriously discuss this topic, aiming to find solutions and to learn jointly[3].

In this context, I would like to give an insight on the topic from the European perspective, especially in relation to the structural planning and implementation of projects that establish a common ground for all people.

1 Access City The European Award for Accessible Cities, http://ec.europa.eu/justice/discrimination/files/accesscity_practice_guide_en.pdf
2 Sibylle Heeg, Katharina Bäuerle, „ Demenzgruppen und bauliches Milieu", Mabuse Verlag, FFM, 2008
3 United Nations, Department of Economic and Social Affairs, Population Division, "Population Ageing and Development 2009", www.unpopulation.org

Universal Design

To create a human-orientated environment, it is necessary to design and construct spaces, in which all people are integrated and can participate, regardless of their physical situation or their age. Stigmatisation and exclusion should be avoided, encouraging individual independence. Orientation and independence are key factors that allow participation in social life. A person with a visual impairment can, for example, move around in public spaces easily if tactile guidance is available. Then an accompanying person is not required because the system allows independent orientation. Thus, inhibition and fear are reduced.

If the environment is designed universally in a consistent way, all people will be included[4]. According to the etymological dictionary[5] universal means overall, complete, all global, general, all over and originates for Latin: "universalis", meaning "in the whole, entity, general". The concept of "Universal Design" is applied mainly in USA and Japan and supports this idea.

In Germany we use the term "Design für Alle", meaning the development and introduction of concepts, relating to all areas of daily life in society. It effects each person as well as social and economical fields. In this respect, it is substantial to develop an awareness of the multiple needs a society has, especially in connection with the demographic changes in a transforming society, which is becoming older and at the same time healthier.

How should we design our environment appropriately, taking these new forms of life into account? Which measurements are necessary to avoid exclusion and promote independence? What is the environment and who is affected?

"Environment" refers to the entire urban and rural area, the habitat of people, public spaces and public transport, urban quarters, housing, as well as products and information systems. In this context I would like to focus more closely on the idea of "Universal Design".

This concept was formed by the American architect and designer Ronald L. Mace. In 1980 he established the "Centre of Universal Design", School of Design at the North Carolina State University in Raleigh, USA. Together with a team of architects' product designers, engineers and researchers, he developed seven basic principles for the implementation of Universal Design. These seven principles

4 UN "Convention on the Rights of Persons with Disabilities", http://www.un.org/disabilities/convention/conventionfull.shtml

5 Duden «Etymologie» – Herkunftswörterbuch der deutschen Sprache

are applicable in architecture, urban planning, product design and the development of systems and equipment. The aim is to achieve independence for the largest possible group[6].

Target group

Universal Design addresses all people equally. It is irrelevant whether a person has limited mobility, sight or hearing impairments, is tall or small, old, young or pregnant.

Spaces, sites, structures, equipment and systems should be designed, developed and implemented in a way, that they are usable and accessible to all people in a natural and self-evident way. Good design is self-explanatory, intuitively usable, without being obvious. Spatial design should be generic and usable by all. In order to implement such concepts, a general analysis of the potential limitations is essential. Out of this, relevant needs for planning can be generated. Initially the analysis deals with all who are excluded by established planning and building methods, with requirements to the built environment that do not support an independent orientation and accessibility. Here in particular the physical and sensory limitations are considered: mobility, visual, tactile, auditory, olfactory and possible also gustatory (considering in particular people with dementia).

Definition of Disability

Barrier-free Planning or Universal Design refers to a built environment, which allows all people to participate in and use, without restrictions and regardless of their physical condition or age.

Barrier-free Planning defines qualities of buildings and other built manufactures, which allow the use and accessibility to everyone with or without disabilities in a usual way, without difficulties and basically without any help.

Barrier-free Planning relates to public spaces and sites, public transport systems, housing and residential areas, whose spaces are accessible and usable for people with sensory or mobility impairments and for those who occasionally need a wheelchair.

6 Molly Follette , James L. Mueller, Ronald L. Mace "The Universal Design File - Designing for People of All Ages and Abilities" 1998, NC State University, Published by The Centre for Universal Design

Since May 2002 the "Behindertengleichstellungs-gesetz"[7], the "Disability Discrimination Act" is valid in Germany. It explicitly defines that buildings, facilities, transportation, technical utility items, information systems, acoustic and visual sources of information and communication facilities, as well as other designed living spaces, are accessible in terms of barrier-free planning, if disabled people can generally use and access them in the common way, without particular difficulties and without help.

Demographic Development in Europe und Germany

Through 2050, world-wide, the population of people over sixty years is expected to rise from 600 million to nearly 2 billion. The percentage of people exceeding sixty years of age will increase from 10 % to over 21%. Especially in the developing countries, the number of older people is expected to rise the fastest as in % and in absolute numbers. Potentially, the number will quadruple. In Asia and Latin America, the proportion of older people will rise from 8% to 15 % until 2050, in Africa however, an increase from only 5% to 6% is expected. In Europe the ratio of older people will rise from 1998 until 2025 from 25% to 28%, in North America from 16% to 26%[8].

Altogether this development will mean a fifty-fifty distribution of world population between young and old in the middle of the century. The percentage of old people will increase considerably, whereas the proportion of children will decrease to about a third. The UNO-Resolution[9] speaks about "challenges resulting from the relationship between ageing and unemployment and sustainability of pension systems, while developing countries face the challenge of simultaneous development and population ageing". These are major challenges, especially for the developing countries[10].

7 Gesetz zur Gleichstellung behinderter Menschen (Behindertengleichstellungsgesetz - BGG) Behindertengleichstellungsgesetz vom 27. April 2002 (BGBl. I S. 1467, 1468), zuletzt durch Artikel 12 des Gesetzes vom 19. Dezember 2007 (BGBl. I S. 3024)

8 "2008 United Nations Demographic Yearbook", Sixtieth Edition, NY, 2010

9 United Nations publication; "Report of the Second World Assembly on Ageing"

10 Serge Halimi, Barbara Bauer, Philippe Rekacewicz „Le Monde -Atlas der Globalisierung", TAZ Verlag, 2009

Grafik: Le Monde_Atlas der Globalisierung

In the future it will be essential to develop new strategies, which will allow adjustments to the changing requirements of the built environment. Especially for the planning of future living environments, ageing will become a focal point. Habitation itself will differ between developed and developing countries. According to the "Report of the Second World Assembly on Ageing"[11], in developed countries most elderly people live in urban environments, whereas "the majority of older persons [live] in developing countries in rural areas". In this context, physical health will become a major topic concerning habitation and will also need to be integrated in the discussion. The most frequent physical confinement in old age is the impact of vision. Round 85% of the people with sight impairments are older than sixty years, 10% are between thirty and sixty years and 5% are under thirty years[12].

Visual Restriction and its Relevance for Planning

Eighty to ninety percent of our perception happens by vision. The eyes are the most important sensory organ, whereupon vision decreases during the natural process of ageing and leads to the most common form of disability. Today approximately 150.000 blind and 600.000 people with sight impairments live in Germany. According to the evaluations of the German Blind Association (DBV)[13], 20.000 to 24.000 people loose their eye sight annually. Those with severe sight impairments are older than sixty years.

11 United Nations publication; "Report of the Second World Assembly on Ageing", p.6

12 Karl Matthias Schäfer „Unterstützungsmöglichkeiten für Senioren mit schweren Sehbeeinträchtigungen", 1994, S.1

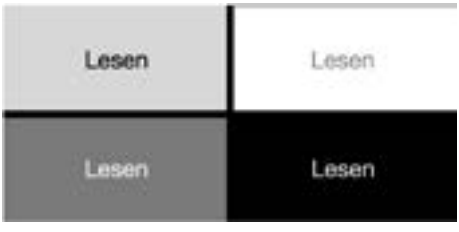
13 Deutsche Blinden- und Sehbehindertenverband e.V. (DBSV)

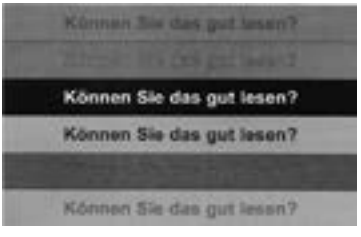
To enable older people to continue to lead a normal life and maintain their mobility, it is important to analyse the options which guarantee integration and independence. Generally, severe sight impairments are seen as belonging to the "normal process of getting old". Up to now, planning aspects that would have taken account for these changes have been neglected. With respect to the prognosis of the demographic developments, this will no longer be possible. Already in Germany it is legally defined that tactile orientation- and guidance-systems have to be installed when public areas and public buildings are redesigned.

Normal vision **50 %** **30%** **5%**

To support individual mobility, buildings and spaces need to be made accessible. For this they need to be designed without steps and thresholds, for example as ground level entrances, elevators and easy motion doors. Adequate design of moving spaces and public traffic areas are important, as well as convenient ergonomic operating elements, supporting handles etc.

Nevertheless, people with profound sight disabilities still orientate themselves by visual information. For this reason adequate contrast, large characters and image presentations are important. German DIN Standards[14] and codes define levels of priority and give details about the relevant grades of contrasts, character and image figures.





" Read" **"Can you read this well?"**

Ulrike Rau (Hrsg) "Barrierefrei - Bauen für die Zukunft" [15]

14 DIN 32975 Gestaltung visueller Informationen im öffentlichen Raum zur barrierefreien Nutzung (Beuth 2007 – 12)

15 Ulrike Rau (Hrsg) "Barrierefrei - Bauen für die Zukunft"Bauwerk Verlag, Berlin 2008

Blind people however, orientate themselves by tactile and acoustical information. Their visual orientation depends on the quality of recognition and a minimum of homogeneity. They need definite structures, most suitable relating to an orthogonal system. Principally, and this is not only relevant for blind people but for all, clear orientation standards in building structures and accentuated orientation points that mark these structures (for example benches, waste paper baskets, letter-boxes etc.), are important objects that support orientation.

Tactile orientation is assisted by guidance-systems[16], which can be built in the pavement by using different slabs or tiles: plane (walking area) and rough (edge). In order to classify and mark streets and paths and define the differing functions (street, parking area, bicycle path, pedestrian path, etc.), it is recommended to use homogeneous materials. Floor indicators give specific tactile information and indicate exceptional situations (for example traffic crossings, bus-, train-, tram-stations, etc.). These indicators are also used as protection lines, for example at edges on stations and have to be installed in the correct direction: crossways to the walking direction, so that it can be recognised without problems when using the white cane.

Tactile slabs and tiles

Bus stop with floor indicators and tactile information

A basic pre-condition for visual orientation is the perception of contrasts. Visual contrasts are regulated by luminosity, which supports orientation. Objects become visible by contrast, luminosity, colour and form. Apart from the contrast of colour, light density, brightness (describes the difference between the lighting of an object related to its background) is also important for orientation. If the indication is rich in contrast it is easier for people with sight disabilities to find their way, where a directed guidance in specific areas, facilities, infrastructures and objects (entrances, stopping places, train stations, waiting areas, toilets, etc.) is very important.

Exemplified Implementation

Which measurements are necessary in order to react accordingly to present and future social settings? Which technologies are on

16 DIN 32984 Bodenindikatoren im öffentlichen Verkehrsraum, Beuth (2000/05)

the market and would support independence, specifically for older people without stigmatizing them? Generally, tactile guidance- and orientation- systems, which are installed in Europe and especially in Germany, are static systems[17]. They are characterized by attention fields, junction fields, ground-indicating systems, entry-regulators and continuative guidance-systems. Explicit information, which should support the orientation in complex spatial settings, is often non existent. Preferably, a concept which offers a flexible, accessible common base between paths, squares, entrances, buildings, crossovers and entrances to vehicles, is needed.

Meanwhile, there is targeted research which develops compensatory technologies for handicaps, based on the principle of guidance- and orientation-systems. The intention is to design concepts in terms of Universal Design, which are creatively and also functionally appealing, and preferably usable for a large target group. Assistive technologies, that will allow effective application, are in research. For this purpose it is essential to have explicit instructions, which support conductive locomotion. Navigation systems specifically designed for pedestrians and in particular for visually impaired and blind people, are based on GPS and RFID systems (telecommunications system) as well as mobile telecommunication systems, which supplement the existing complex tactile guiding and orientation.

RFID technology[18] (Radio Frequency Identification) is built into a special reading device, which could support orientation in public spaces by serving as a transmitter- and receiver unit. Passive radio transponders (data medium) merely absorb and dispense radio signals, and help people with vision impairments to locate and guide them. This equipment is independent and does not need electrical power supply, so that it can be used outside without any problems, e.g. in parks, in pedestrian areas, in city centres. By using Bluetooth-technology with a cell phone, data can be imported over a chip, giving the user information about site, surroundings, characteristics of the location, connections with public transport etc. This transponder can be built into a white cane, for example. The reciprocal communication between user, transponder and a central server (over the cell phone) guarantees orientation and gives directions.

This kind of mobility through navigation can be done via satellite. To ensure this however, it is necessary to deposit sufficient cartographical

17 e.g Easycross Leitsysteme www.klostermann-beton.de
18 http://www.brooks-rfid.com/de/rfid-grundlagen.html

material and a precise determination of the position within a few meters is required. Through the installation of wireless chips, the system is supplemented by electronic path markers. There are various research projects in Germany which already are intensely working on this topic:

Nav4blind_ 2006[19] A research project of the land-registry office in the county Soest (near the Ruhr district, in the north-western part of Germany).

Blind or severely visually impaired people are lead safely over sidewalks or other walk-ways by using satellite and centimetre-accurate navigation and topographical spatial data and thus expand considerably in quality of life and mobility. Nav4blind uses a combined technique, a dual system which communicates via satellite in the interior and exterior space along with RFID, WLAN and telecommunication. This happens in a 30 – 50 cm wide corridor by using the „Global Navigation Satellite System (GNSS)“[20]

“The meaning of GNSS is the technical interoperability and compatibility between various satellite navigation systems such as modernized GPS, Galileo, reconstructed GLONASS to be used by civilian users without considering the nationalities of each system in order to promote the safety and convenience of life”[21]

Different satellite navigation systems, such as GPS (USA), Galileo (Europe) und GLONASS (Russia), are also used. A satellite positioning service provides a decimeter-level precision. Topographic data, which is illustrated in precise cadastral maps, gives complete information about routing, paths, texture, and also signposting, traffic lights, crossing of intersections, green areas as well as spatial infrastructure. These are the basis for independent orientation.

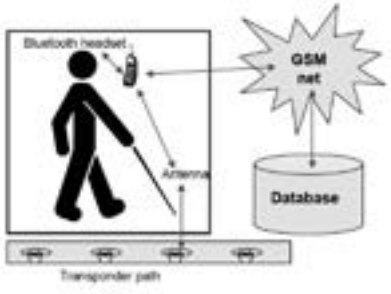
SeSaMoNet[22] (Secure Safe Mobility Network) is a further project, implemented in Laveno-Mombello, close to Ispra in Italy. Here too, the project is based on RFID technology, which has been inserted in a first virtual route.

1260 Passive transponders have been built in the public paving over a stretch of 2 km and correspond with the white cane. Visually impaired

19 Projekt „NAV4BLIND- Navigation für blinde und stark sehbehinderte Menschen“ County Soest, 2006, http://www.kreis-soest.de/buergerinfo/produkte/pr297.php
20 www.princeton.edu/~alaink/Orf467F07/GNSS.pdf
21 Global Navigation Satellite System (GNSS), www.princeton.edu/~alaink/Orf467F07/GNSS.pdf (GALILEO, 2003; Feng, 2003).
22 European Commission, Joint Research Centre, http://ec.europa.eu/dgs/jrc/index.cfm?id=4210

www3.varesenews.it/.../200909/piazza.jpg

or blind people can use this route safely. This prototype was developed with the branch office of the Joint Research Centres (JRC) in Ispra. The expenses for the RFID routes depend on the size and the complexity of the surroundings as well as the development and the maintenance of the data storage unit.



www3.varesenews.it/.../200909/piazza.jpg

These visionary and innovative research projects deal with the expected demographic impacts of an ageing society world-wide and can be important initiatives. As this is a global phenomenon, solutions which are cost-effective, pragmatic and easy to install are sensible. The RFID technology offers such concepts: chips are recycled, they are simple to build them in and the technology is available and in use.

In my opinion it is essential to lead an open discussion about social structures, requirements and expectations in connection with planning and building processes. Our global world offers best options to advance in this discussion and exchange our knowledge about existing concepts, with the goal to implement new standards that could be valid worldwide. Altogether it is inevitable to investigate these topic and find new solutions, which will allow us to react to the immense estimated requirements.

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