Trends in Universal Design

An anthology with global perspectives, theoretical aspects and real world examples

The Delta Centre

Norwegian Directorate for Children, Youth and Family Affairs

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Preface

In 2012 Norway hosted the largest conference on universal design held in Europe until then. The conference gathered researchers, students, users, planners, public officers and other practitioners from 44 countries. More than 150 different lectures were given.

The main topics that were presented at the conference were universal design in planning, legislation, politics, education, buildings, outdoor areas, information and communications technologies and public transport. Through participants' evaluation, feedback from hosts, moderators and the conference reference group an editorial board selected the contributors for this publication.

What are the trends of Universal Design from a European perspective? What is the status of Universal Design both conceptually and in practice – as seen from the lenses of UD2012Oslo? With this multidisciplinary anthology containing samples from around the globe, we have aimed to inspire both practitioners in the field as well as academic work on universal design.

The Delta Centre is the Government's National Resource Centre for Participation and Accessibility and forms part of the Norwegian Directorate for Children, Youth and Family Affairs. By nurturing theoretical discussions and bringing forward concrete examples of Universal Design projects, the Delta Centre works for an inclusive society for a diverse population.

Project manager and editor for the publication is Ms Sigrid Skavlid, senior adviser at The Delta Centre, with co-editor Mr Hans Petter Olsen, lecturer in Universal Design at Gjøvik University College and Ms Åse Kari Haugeto, head of the Delta Centre.

The content of the articles represents the views of the authors.

I do hope this publication will inspire you as we were inspired by the conference!
Best wishes,

Mari Trommald
[Director, Norwegian Directorate for Children, Youth and Family Affairs]

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Trend Spotting at UD2012Oslo

Åse Kari Haugeto,
[Head of the Delta Centre, Norway]

The Delta Centre was asked by the government to take the lead in arranging the first world conference on Universal Design ever held in Europe. For us the project UD2012 was a huge process lasting for two to three years. It was a project where we really had to re-explore what was happening around the world in the very broad field of Universal Design. We searched both among researchers and in practice, and we found a lot! The final program was composed of more than 150 contributors from all over the world, as well as workshops and exhibitions etc. The main topics that were presented at the conference were universal design in planning, legislation, politics, education, buildings, outdoor areas, information and communications technologies and public transport.

With "Trends in Universal Design" we hope to be able to grasp and represent some of what was going on at the conference.

What is Universal Design?

The term universal design was first entered into usage in the mid 1980's by the American architect, Ronald L. Mace. During the nineties Universal Design was a concept embraced in several countries.

With the UN Convention on the Rights of Persons with Disabilities, which has been acknowledged and ratified by many countries, universal design received a globally accepted definition: *Universal Design means the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. "Universal design" shall not exclude assistive devices for particular groups of persons with disabilities where this is needed.*

The concept of universal design has now spread worldwide and is practiced in many different ways. New ideas and new professional methods have been implemented, and the concept has many names and professionals connected to it, such as: Design for All, Inclusive Design, Participatory Design, Human Centered Design, Usability, Life Span Design, Independent Living etc.

The way of emphasizing the concept varies upon ones professional background, and also on the society and culture we are a part of.

The Delta Centre

The Delta Centre is the Norwegian National Resource Centre for Participation and Accessibility. It was founded as a project back in 1996. Now The Delta Centre is a part of the government, organized as a unit in the Directorate for Children, Youth and Family Affairs.

The primary objective of the Delta Centre is to contribute to enabling people with disabilities to participate in society on equal terms with other citizens. The centre's vision is participation and accessibility for all. Our focus is on Universal Design.

Through our work the Delta Centre shall contribute to the achievement of government targets for increased accessibility and universal design.

The Nordic countries have a common cultural base as well as a society based on the welfare state and we share a political goal to encourage social cohesion. Therefore a group of Nordic professionals formed a Nordic Charter on Universal Design and launched it during the conference UD2012. The charter presents rationales for a successful investment in Universal Design from a Nordic perspective. It is also presented in this publication.
The rationales are:

- **To achieve participation and empowerment for all through Universal Design**
- **To value human diversity in society**
- **To ensure sustainable solutions through Universal Design**
- **To secure that governments take responsibility and stimulate the development of Universal Design policies and strategies**
- **To encourage cross-sectorial and interdisciplinary work**
- **To innovate through Universal Design**
- **To increase understanding of the benefits of Universal Design within the population**

Trends in Universal Design

From the conference in Oslo we have a broad range of material about what is going on around the globe within the field of Universal Design. We have tried to analyse trends in the development of Universal Design. Obviously the situation varies a lot from one country to another, and the western world is still dominating the international scene. But still we have been able to spot some trends and new discussions that were emerging at the conference. This publication is built upon three trends we found in our material.

The first trend that we present is **from regulation to innovation**. There has long been a focus on legislation, regulations and standardizations with a main purpose of defining minimum quality standards for different user groups. This work is on-going and important to both national and international plans for making interoperable solutions.

But there is a risk that an exclusive focus only on technical standards will give too much attention to the minimum solutions rather than rethinking and innovating universal design with a broader view.

The conference gathered:

Researchers, students, users, planners, public officers and other practitioners from 44 countries.

There are companies that successfully practice the universal design of their products and services, going in front of laws and regulations. These companies are innovating, while delivering high quality to a diverse population and thus meeting needs in the marketplace.

Why do other companies not practice universal design, and what might motivate them to adopt it? What are the most effective efforts that can be done to increase the number of companies successfully practicing universal design?

The next trend is **from accessibility to inclusion**. From having a more strict focus on separate physical solutions such as ramps for wheelchair-users and tactile lines for blind people, there has increasingly developed a broader view on the total service or activity that is going to be universal, such as visiting a cinema, travelling by train, or being a tourist in a city. This trend goes well with the merging of new services and service-design as a work method, bringing a more holistic view of the final user experience.

How can the social inclusion perspective be a stronger driving force in universal design? How to strengthen the user perspective and what kind of improvements does this give?

The final trend is **from barriers to sustainability**. Universal design has both economic and social implications. Focusing on barriers for a minority of the population could be expensive, and there are forces trying to limit the spending on accessibility. But inclusion supports contribution, and contribution creates quality and growth. To build a sustainable society, all individuals should have possibilities to contribute.

How to argue focus on the sustainable aspect of universal design? And how to create an understanding that investment in universal design is an investment in a sustainable society?

Whether the future development of universal design will follow these trends remains to be seen. If so, we will be able to develop more human centred and more inclusive societies with greater possibilities for everyone to participate, contribute and enjoy!

1 Politics, regulation and innovation

Aiming at equality

Director General Arni Hole
[The Ministry of Children, Equality and Social Inclusion, Norway]

Universal design is truly universal. The concept covers a vast number of subjects and policies. My Ministry coordinates the National Action Plans for universal design and increased accessibility.

15 out of 18 ministries participate in the plan, many with far-reaching measures. The plan focuses on universal design of buildings, transport, planning, out-door areas and information and communication technology (ICT). This implies that some of the ministries are more involved in the plan than others. The ministries responsible for transport, building, planning and ICT-policies are very active, and universal design is mainstreamed in the policies and work of these ministries.

Other ministries may have more limited possibilities to influence the development of universal design in the environment but important contributions are made. The Ministry of Trade and Industry supports the development of universally designed products; the Ministry of Education and Research pushes forward the design of more inclusive environments for pupils and students at every level in the educational system. Even the Ministry of Defence participates in the action plan due to the Ministry's responsibility for buildings used by civilian personnel, historical castles and installations.

The Ministry of Health and Care Services was, for a number of decades, the ministry responsible for accessibility for people with disabilities. In the National Action Plan for universal design and increased accessibility 2009-2013 the Ministry of Health and Care Services still has an important role, but now primarily as the owner of hospitals and other health care institutions. It is crucial that these are universally designed.

It definitely marked a milestone in ideological and political thinking when The Ministry of Children, Equality and Social Inclusion took over the coordination of the National Action Plan for universal design and increased accessibility in 2009. This demonstrates that universal design and accessibility for people with disabilities has yet another important aspect; equality and non-discrimination.

Universal design calls for the skills of a wide range of professionals. Architects, engineers, designers, social scientists, occupational therapists, builders, plumbers, planners, economists and many more are needed to produce good solutions in the various different fields.

Universal design shall accommodate all users!

The experience and competence of the users, especially people with disabilities, is vital to the accomplishment of true universal design.

It is fascinating and very satisfying to experience how small details in the design of, for example, a bus can change the daily life of many people. It is gratifying to see how simple changes in web-design and ICT products can give more people new and fundamental possibilities. Universal design supports equity and equality. It is a building block for Human Rights and true democracy.

This has an impact on our societies as a whole. Many people can reduce their need for help, assistance and care. Many more can receive education and be part of the work force. It is about independent living, isn't it?

Recent research revealed that the whole population appreciates universal design. *People find universal design attractive and prefer buildings, outdoor areas and transport with good accessibility and well designed information.* Most people are even willing to pay more for such qualities!

Many countries experience a change in demographics. The number of senior citizens

will increase and the number of people in the work force will decrease. This may threaten the social and economic balance. Universal design is *one of many measures* to secure continued social and economic sustainability. Small, well designed details have an impact on a national scale.

Universal design is also universal in a global sense. Accessibility has been an issue for many decades in all parts of the world. We may call it a basic value.

Still, we must develop the concept of accessibility further. One example: making one accessible entrance for people with disabilities and another one for the rest of the population does not comply with our standards for equality. We need concepts that embrace recent developments in equality ideology; we need to comply with recent laws and regulations, and societal developments.

"Universal design", "inclusive design" and "design for all" are all such concepts. They improve our thinking of the environments *we create*. We produce environments continuously.

Ratification of the UN Convention on the Rights of Persons with Disabilities

Universal design is on the agenda of many international institutions and organizations. It is included in the work of the Nordic Council of Ministers, where all the Nordic countries are members. The Council of Europe, with 47 member states, has promoted universal design for more than ten years, resulting in valuable discussions and a number of resolutions supporting the use of universal design. The European Union has demonstrated both determination and a will to implement requirements concerning accessibility and design for all. Important and far reaching initiatives have been taken. A crucial foundation for national initiatives and global attention and cooperation is the UN Convention on the Rights of Persons with disabilities: the CRPD. So far the Convention has been signed by 153 countries and ratified by 112. Norway ratified the Convention in 2013.

The vision of the Norwegian Government is that Norway shall be universally designed by 2025. This is definitely achievable, but we are not there yet. An evaluation of the action plan in 2013 concluded that the plan had been successful and advised the implementation of a new action plan starting in 2014. The evaluation report argued that an action plan was a good and necessary supplementary tool to further increase the effects of important measures such as laws, regulations and standards. At all times we should remind each other of the importance of the exchanging of views, experiences and good practices.

The aim of the universal design conference in Oslo in 2012 was to Inspire, Challenge, and Empower. The Ministry of Children, Equality and Social Inclusion was very pleased to learn that the participants agreed that this was the outcome of the conference.

The conference was certainly inspiring for the Norwegian authorities. The presentations given by lecturers from all over the world gave valuable input to the work in Norway for the coming years.

“People find universal design attractive and prefer buildings, outdoor areas and transport with good accessibility and well designed information.”

Improving accessibility in Europe

Rudolph Brynn, Project Manager [Standards Norway]

The European Union's legal and political competences in working for accessibility for all, and the main organisation of activities to achieve this objective, are presented in this article. This includes legislation, mandates to the standardisation bodies, action plans and other policy implementing tools.

The article is based on a presentation made by Inmaculada Placencia Porrero, Deputy Head of Unit, European Commission DG Justice.

Background: demographic challenges

Approximately between 10 and 15 % of the working age population in the EU are persons reporting disability. ***For instance 32 % of people aged 55-64 report a disability.***

Fundamental Treaties: Anti-discrimination clause

There is no single legal basis for the EU's work to improve accessibility in Europe but the most important legal act is Article 19 in the Fundamental Treaties of the European Union (TFEU) authorising the EU to combat discrimination on the basis of disability.

Other legal bases are also relevant according to the principle of mainstreaming, obliging various policy sectors to combat discrimination and ensuring accessibility, for instance, transport, state aid, employment, social policy, education and public health.

Legislation: legal and political basis for EU legislation

The European Union's legal competence in working to achieve the objectives of the United Nations' Convention on the Rights of Persons with Disabilities lies between international (UN's) and national (the EU Member States') levels of legal competence.

The original involvement of the EC (under the pre-Amsterdam treaties) in the area of disability was limited. This was because none of the Pre-Amsterdam treaties contained a reference to disability. The European Community Disability Strategy was inspired by the UN Standard Rules and signaled a rights-based approach to international policy towards disabled people.

Treaty of Amsterdam

The Treaty of Amsterdam (1997, came into force 1999) restated the principle of non-discrimination in stronger terms, adding a new provision to the EC Treaty: Art. 13 EC (now Art. 19 TFEU). The Article 13 EC enabled the Council to take appropriate action to combat discrimination based on sex, racial or ethnic origin, religion or belief, disability, age or sexual orientation.

The Intergovernmental Conference that drew up the Treaty of Amsterdam decided to include a declaration in the Final Act, stating that the Community institutions must take account of the needs of persons with a disability when adopting measures under former Art. 95 EC to approximate Member States' legislation. In the Declaration of Competence there are 18 legal acts on accessibility, 10 on independent living, social inclusion work and employment, 9 on personal mobility, 5 on access to information, 5 on statistics and data collection and 3 on development cooperation.

The UN Convention and EU

There are several motivating factors behind the EU's initiatives to ensure accessibility for all, but the two most important factors are the ratification by the EU of the UN Convention on the Rights of Persons with Disabilities (the first ratification by the EU as an entity of a UN Convention), and the challenges of the ageing of the population in Europe.

The articles in the UN Convention relevant to the issue of accessibility are Article 3 Accessibility as a general principle and Article 9 Accessibility. The latter states that "the State parties (are) to undertake appropriate measures to ensure equal access for persons with disabilities". In addition the State parties shall develop, promulgate and monitor the implementation of minimum standards and guidelines for accessible facilities and services open to the public, and that private entities offering facilities and services open to the public take into account all aspects of accessibility and to promote design, development and distribution of accessible ICT and systems at an early stage, to ensure they become accessible at minimum cost.

EU legislation relevant for accessibility

Since the 1990s the EU has adopted several legal acts relevant for accessibility in the EU and EEA Member States:

- Legislation in the transport sector, including rights of passengers in bus and coach, by sea and inland waterways and air and rail transport.
- In the field of information society technology the EU is amending a common regulatory framework for electronic communications networks and services. The EU has developed an eAccessibility Policy and has proposed an eAccessibility Directive.
- A Regulation from 2011 lays down harmonised conditions for the marketing of construction products, repealing Council Directive 89/106/EEC, in addition to national and local legislation on the built environment in the Member States.
- Current developments include revision of the Public Procurement Directives COM(2011) 896 introducing new clauses on accessibility.
- A new Structural Funds regulation COM(2011) 615 includes articles on discrimination, description of disability and accessibility operational programmes, monitoring and reporting, as well as ex ante conditionalities on the UN Convention and accessibility.

Policy: development of EU Policy and strategy

An important current document for describing the European Union's strategy towards an accessible Europe is the "European Disability Strategy 2010-2020: a renewed commitment to a barrier-free Europe". Based on the observations that there are not enough accessible goods and services in the European market, that fragmentation of markets must be removed through harmonisation, and that there are barriers for free movement of persons with disabilities, the European Disability Strategy aims to develop standards for particular sectors, improve the proper function of the internal market, use legislative and other instruments like standardisation, optimise the accessibility of buildings, ICT and transport and finally to evaluate the efficiency of regulatory measures, based on the principles of smarter regulations to ensure accessibility, in particular through public procurement.

Main EU policy objectives

The main areas for the EU's actions will be first and foremost to ensure accessibility to goods and services. Related objectives are:

- participation for persons with disabilities as equal citizens in Europe
- community-based services
- equality and combating discrimination
- employment in the open labour market
- inclusive education and training
- social protection to combat poverty and social exclusion
- ensuring equal access to health services and related facilities
- external action including EU enlargement, neighbourhood and international development programmes.

The means: standardisation as a tool for accessibility

The European Commission makes use of mandates to the European standardisation bodies CEN, CENELEC and ETSI to develop standards that play a vital role in making non-legal requirements of producers of goods and services, to ensure the inclusion of accessibility aspects.

Mandates

This New Approach strategy on standardisation has resulted in a broad range of activities, concentrated in the following mandates:

- Mandate 376: Accessibility requirements for public procurement of products and services in the ICT domain. The work has produced a draft European standard EN ETSI 301 549, which in 2013 is out for public consultation. In the field of websites, the WCAG 2.0 guideline (ISO/IEC 40500) plays an important part.

- Other deliverables include:
  - a Technical Report (TR) listing the standards and specifications used for the European standard and test descriptions and evaluation methodologies
  - a Technical Report giving guidelines for award criteria; a Technical Report containing all reference documents needed to assess conformity, whether declaration or certification is needed to have the various schemes operational and if organisations would like to self declare or certify. This includes format templates for declaring conformity and certifying methods that can be referred to by the procurers
  - an online electronic toolkit for procurers, a guideline and a bibliography among others
  - additional guidance and support material for procurers, published as part of the online toolkit.
- Mandate 420: Accessibility requirements for public procurement in the built environment (including transport infrastructures). This mandate has completed its Phase I which yielded a comprehensive overview as to existing legislation and standardisation in the countries monitored. The inventory covered building elements, internal environments, transport facilities and specific building uses as well as outdoor areas. All countries reported gaps in the combined coverage of user requirements.

  Phase II will result in the production of standard(s) and associated deliverables when started. Standardisation recommendations following the inventory include guidance in the form of a toolkit for public procurers, showing how to clearly identify the legal requirements for equality and inclusion and also, how they should be addressed in developing accessible and inclusive built environments, who should be involved in the process and who is responsible for ensuring delivery. Also needed is a common EU normative document for Accessibility in the Built Environment. The Report from Phase I also made legal recommendations.
- Mandate 473: to include Accessibility following Design for All in relevant standardisation activities. This Mandate, which is organised through Standards Norway, is to result in the development of a methodology for standardisation committees on how to include accessibility when revising or developing standards, develop a standardisation work programme as well as testing out the methodology in practical standardisation work and producing new standards to enable manufacturing industry and public and private service providers to consider accessibility in their processes.
- Mandate 371: Services, includes several sectors like tourism and transport for people with disabilities.

Possible future policy of EU

A central part will be played by the proposed European Accessibility Act: improving accessibility of goods and services in the Internal Market. A public hearing on the proposed legal act is now ongoing. The objectives of the Accessibility Act is to remove market fragmentation, create economies of scale, remedy market failures and increase competition among industry on accessibility, as well as to improve availability of accessible goods and services.

The EU has introduced legislation ensuring the right to equal access to train travel for persons with reduced mobility.

Policy alternatives: Legislative and non-legislative approach

There are several policy alternatives available for the EU:

- A legislative approach would be to make compulsory the purchase of accessible goods and services; decide on one or two framework Directives with general accessibility obligations on manufacturers to improve goods and services; a Regulation with similar accessibility requirements and a combination of the above with an Action Plan.
- A non-legislative alternative for the EU is to rely on voluntary response based on a Recommendation referring to common standard based accessibility requirements and foster self-regulation by industry and service providers to improve accessibility and follow an action plan of "soft measures", concentrating e.g. on standards developments.

Other measures include the commissioning under the PROGRESS Programme of a study on the situation of accessibility in Europe and related cost-benefit analysis of measures to improve accessibility in several areas. The contractor, Deloitte, will study aspects of the internal market, industry problems, accessibility to relevant goods and services, user barriers, relevant sectors, options and assessment of impacts.

At the moment of writing, it seems that the EU has concluded that a legislative approach – a European Accessibility Act is necessary, and has proposed an eAccessibility Directive that will come into force in 2014.

The time is set for a combination of legislation and other measures such as standardisation to achieve accessibility for all.

Eurocities Working Group Barrier-free City for All

Gerd Grenner [Senate Department for Urban Development and the Environment; Germany]

EUROCITIES is the network of major European cities bringing together the local governments of more than 130 large cities in over 35 European countries. On the initiative of Berlin, the working group "Barrier-free City for All" was formed in order to learn more about interesting developments in other European cities and to bring together a network of stakeholders to promote developments in the field of the "Barrier-free city", both conceptually and practically.

Themes for the exchange of experience include:

- Barrier-free design of traffic and street space
- Access for all to public transport
- Barrier-free public spaces (buildings and open spaces)
- Barrier-free utilisation of services/communication
- Tourism for all and marketing strategies

Challenges for cities:

Cities should be accessible in all their diversity, without obstacles. Therefore, the task will be to continue changing public buildings and spaces so that they can be used by everyone independently, simply, intuitively and comfortably. The principles of Design for All remain a challenge that will determine the quality of our city.

Statutory regulations on accessibility at European and national levels are a precondition for the social participation of people with disabilities. For this reason, these statutory requirements should be formulated clearly and coherently. Standards and minimum dimensions must be stated. Architects, engineers and builders well trained on the different aspects of accessibility are a prerequisite for implementing statutory requirements consistently.

The following cities are members of the working group:

Barcelona, Berlin Chemnitz, Cologne, Copenhagen, Dresden, Frankfurt/Main, Grand Lyon, Hamburg, Helsinki, Lille-Metropolregion, Munich, Oslo, Paris, Prague, Southampton, The Hague, Toulouse, Vienna and Warsaw.

How to promote

Universal Design through Passion, Knowledge and Regulations?

Susan Ruptash [Quadrangle Architects, Canada]

As an architect and a life-long advocate for a more accessible world, I am interested in how to most effectively create change to promote the use of Universal Design. I believe that our best opportunity for change is to harness the power of knowledge, regulations and advocacy together as one.

Background

In Canada, we are on the cusp of great change in the awareness, acceptance and embracing of Universal Design. Our mandatory building code requirements and other accessible standards remain inadequate and far behind many parts of the world. Increasing public awareness of Universal Design and the impacts of our aging populations are offering fresh opportunities to highlight the benefits and business case for Universal Design. We are using parallels to the sustainability movement that has swept the design profession to show how change can be promoted within the profession and the public. I would like to highlight three intersecting approaches, and how each can contribute to the advancement of Universal Design: strengthening regulations in order to increase the acceptable baseline; spreading knowledge through speaking, teaching and writing, and building support through advocacy and representation. By informing design professionals, building owners and the general public of the benefits of a Universal Design approach on both social and financial levels, we can help to highlight the added value that Universal Design can bring.

Knowledge

Good knowledge backed by clear, defensible research and hard data is the best foundation for an effective change strategy. A knowledgeable person is able to speak with passion and persuasion, buoyed by the confidence that their opinions are backed by solid facts.

In the world of Universal Design, there have been large voids in terms of hard data and research to support opinions on areas such as minimum floor areas required for a variety of wheeled mobility devices and reach ranges. Recent developments in research in these areas have helped to quantify required dimensions and add academic credence to those lobbying for changes in required minimum standards.

Universal Design research must always include user input and the perspectives of persons with disabilities. There is undeniable value in alternative perspectives, and the process of collaboration helps us to test and fine tune our ideas.

Knowledge can be shared and spread through teaching, speaking and writing.

Regulations

At its best, Universal Design is an integrated, conceptual approach to design that from the very start seeks to consider the preferences of as many people as possible. In an ideal world, we would not require regulations for accessible design; however we are not yet there. Strong regulations are required to set a minimum baseline for those who are looking for the lowest level of compliance, or those who do not yet fully understand the theories and details of Universal Design.

There is a need for us to move towards better consistency and clarity in the wide variety of regulatory requirements, as the vast array of standards can be confusing to designers, and often come from a weak basis in research. Regulations need to consider and address the complete range of abilities and disabilities found in humans.

The danger of accessibility regulations is that they can be restrictive and cause barriers to true integrated universal design. For that

Workshop discussion.

reason, the minimum standards must always be considered in the realm of offering flexibility where possible so as not to inhibit innovation. All regulations should discuss the ethos and principles of Universal Design to encourage designers to strive for a higher level of integration in their work.

The Canadian province of Ontario recently enacted broad accessibility legislation with the goal of making Ontario fully accessible by 2025. This legislation covers customer service for persons with disabilities, employment, transportation, information and communications, as well as the traditional built environment regulations. The impact of such sweeping legislation has been a huge swell of awareness and interest in Universal Design, offering great opportunities for education and enlightenment.

Advocacy

There is great power in passion. Those of us who believe so strongly in the importance of Universal Design must work to inform and engage those around us to continue to broaden knowledge and acceptance.

There are many parallels between the sustainable design movement and the universal design movement. Both started from a small but passionate group of knowledgeable advocates. The sea-change happens when the appeal jumps to the public mainstream. The sustainable design movement was aided by the 'Al Gore Effect', in which Al Gore's road trip to promote his 2006 documentary, An Inconvenient Truth, resulted in an increase in awareness of climate change and a resultant increase in demand from the general public for sustainable building solutions. The Universal Design movement would benefit from an increased profile of advocacy.

Universal Design shares other alignments with sustainable design. We know there is a growing trend to build more accessible cities, public spaces and buildings. We know our population is aging. If we can incorporate Universal Design in our planning now, we will reduce the number of buildings and features that we need to remove and renovate in the future.

Universal design is also socially sustainable, supporting the basic human rights of equity, independence and diversity.

Knowledge, Regulations, Advocacy

At the intersection of the three lies the power of change.

The aging population around the world has helped to illuminate the issues of Universal Design. The beauty of well-executed Universal Design is that it makes it easier (and more delightful) for everyone to move about their day. As we age, we take on many characteristics of various disabilities – our strength, reach and mobility diminish, our visual acuity lessens and we become more sensitive to glare; our hearing declines. Universal Design helps to future-proof our homes and workplaces, and extends the time that we can comfortably remain independent.

A collaborative and inclusive design process can lead to better solutions, while simultaneously advancing the discourse and knowledge. Universal Design is inclusive and sustainable.

Summary

We need to start from a strong foundation of knowledge. Our opinions and beliefs are strengthened by a backdrop of facts. We need continuous research and rigorous data to support our conjectures and give credence to our beliefs. We need to constantly re-evaluate our assumptions of the rapidly changing world. We need to seek the knowledge and opinions of persons with disabilities.

We need strong accessibility regulations to set a baseline for a minimally acceptable level of accessibility. Regulations around the world need to be made more stringent and more consistent, while acknowledging the wide variety of physical and cultural differences in different areas. Regulations must be developed in consultation with persons with disabilities to ensure a broad perspective.

We need to advocate tirelessly for Universal Design. It is important, it is timely, and it is the right thing to do. Universal Design remains a new or confusing concept to many people. When we can unleash the power of public acceptance, we will see great progress.

Knowledge, Regulations, Advocacy.

At the intersection of the three lies the power of change.

Innovation and Universal Design

Professor Edward Steinfeld
[Department of Architecture, University at Buffalo,
State University of New York, USA]

Accessibility is generally implemented by legal mandates. Universal design, on the other hand, is a continuous improvement process rather than a compliance process. Educational and dissemination activities are therefore the key to promoting implementation.

The concept of universal design represents an innovative way of thinking about the built environment. This new perspective is catching on with the general public. Corporate advertising campaigns featuring universal design ideas, such as usability, social sustainability, choice, and personalization, are evidence that the broad spectrum of society is thinking about similar ideas, although they might not be using the same terms to describe it. These companies see that universal design ideas are marketable. But, if one were to poll a large gathering of design professionals, as the author has done frequently, usually only a few acknowledge a previous understanding of the term, even in continuing education programs that target accessibility. In other words, while interest is growing, universal design still has not become a mainstream idea like sustainable design.

Thinking universal design

Problems with understanding the difference between universal design and its precursors are still evident. Even some design and rehabilitation professionals still view universal design as a new buzzword for accessible design or assistive technology. In fact, older books and articles that include the words "universal design" in the title are primarily about compliance with accessibility laws or design for wheelchair use (see, for example, Null 1998). Even today, however, many experts believe that universal design simply means improving regulations to provide a higher level of accessibility.

The basic practice in the field of accessible design is regulatory action and related compliance procedures. Regulations can never demand more accessibility than that defined by their enabling legislation, in this case removing barriers that could be interpreted as discriminatory. Regulations do not address many important issues of universal design. For some universal design strategies, regulation would be difficult or impossible to enforce; for others, the cost impact would be too great to apply to all projects and for still others, the departure from conventional building practices would create opposition from entrenched interest groups. For example, few requirements of regulations directly benefit people with mental health conditions or those with cognitive impairments. Adjustable devices, logical controls, easy-to-read instructions or easy-to-understand building circulation systems are not required. And, in the U.S., automated doors are still not possible to mandate for all public buildings due to cost considerations.

Regulations are generally developed in an incremental manner, rather than a holistic rethinking of a problem. Take the case of lavatory sinks found in most public restrooms. The U.S. regulations require that at least one sink in a restroom be "accessible" and define the features that sink must have. An accessible sink must be mounted a bit higher than lavatory sinks are typically mounted. So, in most public restrooms, there is one sink higher than the rest. It is often a "wheelchair" or "handicapped" sink that has been selected from a catalog because it is "ADA compliant." These sinks are modeled after surgical sinks used in hospitals, cost much more than the typical lavatory sink, and come in limited colors and styles. They also are usually equipped with lever handles for the faucets. It is ironic that the other lavatory sinks are actually too low for a large proportion of the ambulatory population and often have hands-free automated flow devices. Many ambulatory people could benefit from a sink that is even higher than the "accessible" sink and, of course, everyone benefits from hands free use. In applications where children are sharing restrooms with adults, e.g. health care facilities, museums, performing arts facilities, having more than two heights may be a good idea as well. In residential and lodging applications, an adjustable height sink would be the ideal solution to the needs of a diverse population. Universal design, then, addresses the issue of differences in body stature with creative solutions, not a simple regulatory response that often does not even benefit people with disabilities as much as it could.

Innovation Diffusion

Everett Rogers (1995) defines an innovation as anything "perceived to be new." As the example above illustrates, universal design is a process of innovation because it requires people to

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> Universal design is a process of innovation because it requires people to think differently.

think differently. It requires adoption by stakeholders on the *supply side*, like product manufacturers and designers. And, it requires adoption on the *demand side* by the public, employees, real estate developers, building owners, and others who actually use and purchase products and environments. Thinking of universal design in this way suggests that we can gain insight into the best way to advance its adoption by applying general knowledge about innovation. Based on an exhaustive survey of research on the diffusion of innovations, Rogers proposes that innovation is diffused through a sequence of five activities:

1. **Knowledge.** Exposure to an innovation's existence and some understanding of how it functions.
2. **Persuasion.** Forming "a favorable or unfavorable attitude toward the innovation."
3. **Decision.** "[A]ctivities that lead to a choice to adopt or reject the innovation."
4. **Implementation.** "[P]ut[ting] an innovation into use."
5. **Confirmation.** "[R]einforcement of an innovation-decision already made or reversal of a previous decision to adopt or reject the innovation.

Knowledge is obtained through an established pattern of information collection. "Change agents" like universal design advocates and experts put a spin on that knowledge through their persuasive power. However, channels of communication already established through social networks and social worlds often limit exposure to those agents. For example, fewer presentations about universal design will be accepted to an annual architecture professional association conference than to a specialized conference on universal design. But, the latter attracts mostly change agents and early adopters. The confirmation or lack of it will affect further decision making one way or another. If a consumer product with universal design features does not sell, for example, the manufacturer may not be inclined to continue offering such features. Thus, consumer demand is critical to ensuring confirmation to the producer. If the public does not know about the value of universal design features, demand for products with universal design features will be limited.

Utterback (1974) argues that the *rate* of diffusion depends on six attributes of the innovation:

1. **Relative advantage.** Diffusion is enhanced if there are clear relative advantages for the new idea in financial, social, or other terms.
2. **Communicability.** Diffusion is enhanced when the innovation can be explained easily and separated or identified easily.

Sign language interpreters.

3. **Compatibility.** If the innovation is congruent with current norms, values, or structures, it is likely to be accepted more readily.
4. **Nonpervasiveness.** The greater the number of aspects of the organization or society that are potentially influenced by a change, the less likely it is that the change will take place.
5. **Reversibility.** Any innovation diffuses more quickly if it can be experimented with at relatively low cost of time, money, and commitment, making it easy to back out of the decision.
6. **Small number of gatekeepers.** The fewer people involved with "keeping the gates," the greater the chance of having the innovation adopted.

Innovation and Universal Design

Decisions to adopt universal design, on both the supply and demand side, will be heavily influenced by communications – information in media and face-to-face contact. Research has shown that the best venues to communicate the concept are through established channels, e.g. mass media for the demand side and professional and trade associations for the supply side. The concept must be clearly presented and be compatible with current ways of thinking. The public needs to know that universal design has benefits. Implementation may be more successful using an incremental approach rather than making major changes because it improves reversibility for producers. It should not be additionally burdened by a regulatory approach because that increases the number of gatekeepers.

It is important to note that incremental improvements in regulations do not often deliver sufficient benefit to a broad population of end users to propel adoption of universal design. In accessibility regulations, incremental improvements are sufficient because they improve usability for the protected class for which the regulations are devised. But, to achieve universal design, a much greater effort is often needed. The rapid adoption of mobile phones and the simultaneous demise of public telephones illustrate the limited impact of the incremental regulatory approach.

A lot of effort has been invested in making public telephones accessible. Accessibility codes in the U.S. require that the highest operable part of a public telephone be within 48 inches (1220 mm) of the finished floor. The typical solution is to lower the phone. For hearing impaired individuals we add a volume adjustment, an induction coil and a jack for a TTY or an installed TTY. However, these solutions do not produce a usable telephone for tall people, who cannot see the keys without bending; people with vision limitations, who have trouble using the phone in difficult lighting conditions; or individuals who speak a foreign language. It also does

not address such issues as preferences for payment or inability to speak. Solving these problems requires much more than simply lowering the existing unit. Moreover, the adoption of texting on mobile phones has generally replaced the use of TTYs. Universal design strategies for public telephones might include: a large display and keypad that are adjustable for people of different statures and for different ambient illumination levels; instructions in different languages; error messages with instructions for correcting mistakes; and payment in several modes including credit cards.

The availability of mobile phones that can be customized for individual needs and also provide many other information and communication services as well as voice communication, has made the conventional public telephone almost obsolete. There were many other usability problems with public telephones that could not be addressed by regulations, for example: the lack of phones available where they are needed; long waiting times in places where there was a shortage of phones; the lack of privacy in public settings; the high cost to make a call; and vandalism that often made phones inoperative. It is not too farfetched to argue that a major factor contributing to the rapid adoption of mobile telephones was the poor accessibility and usability of the public telephone system as a whole. It provided such poor value that people were willing to pay much more for the convenience of a mobile phone than they ever would to use public telephones. This is the attribute of "relative advantage" that is critical for increasing the adoption of an innovative idea.

The demise of the public telephone and rapid adoption of mobile phones is actually a good demonstration that universal design works. Beyond that, it also demonstrates the need to think beyond incremental change. Despite the fact that mobile phones still have accessibility issues, the increase in usability, safety and convenience they provide has radically changed not only our telephone system but also our culture in a very short time period. It is no accident that people with disabilities who have sufficient income are very heavy users of mobile telephones. Gradually, as the technology develops, the accessibility issues are being addressed through the merging of the telephone with the computer into the "smart phone" and new technologies like Voice Over and customizable gesture based interfaces.

"The demise of the public telephone and rapid adoption of mobile phones is actually a good demonstration that universal design works."

Increasing Adoption

What can advocates do to increase adoption of universal design? The most direct way to increase demand is to make the public at large more aware of universal design through widely used media, such as television and the Internet. Activities that increase consumer awareness are critically important to advance adoption at the local level. To reach professionals, continuing education and the development of communities of practice, especially among educators in professional design disciplines, is a priority. At this stage in the evolution of universal design, it is important not to limit models of practice to a "one best way" so that each sector of industry and professional practice can have a selection of practices to fit with its needs. Successful innovation requires compatibility with the many existing contexts of practice.

Change agents participating in the global community of practice need to work within their own local social networks to find and persuade early adopters of universal design. This requires developing local initiatives in professional societies, educational institutions, corporations, local government, and advocacy organizations. To help confirm the value of universal design in practice, there is a need to organize the knowledge available about best practices and facilitate evidence-based practice. Positive results are needed to confirm the benefits of universal design practice to early adopters and create models for local practices. Sustained implementation of universal design requires an organizational culture of universal design within businesses, service providers, and professional firms. Local and regional efforts like Norway's action plan, "Norway Universally Designed by 2025", are examples of strategies that have great promise to advance adoption because they create communities of practice, generate public information, and provide confirmation to early adopters.

The ultimate test of how swiftly universal design will be adopted will be how the public responds. One of the most promising methods to promote consumer demand is certification and labeling, with a rigorous review and approval process, because it supports marketing efforts on the producer's side while at the same time assuring real performance for the consumer. Currently, any business can claim that it offers universal design products and services. An effective labeling and certification program could ensure that producers, building owners, and service businesses deliver good results when they make that claim.

The rapid increase in the adoption of sustainable design in the U.S. and other countries can be attributed to the LEED certification system developed by The Green Building Council. This system is noteworthy because it integrates many of the strategies noted above. First, it provides a flexible set of standards that give adopters choices that they can adapt to different project constraints and goals. Second, through certification of buildings, products, and practitioners, it increases awareness within existing professional networks and creates its own community of practice that transcends these social worlds. Third, it provides a means, through certification and labeling, to make sustainable design visible. Finally, by recognizing achievement of sustainable design goals, it contributes to the important Confirmation phase of diffusion.

It should also be noted that assistance in execution is an important part of diffusing an innovation. Sustainable design initiatives like the Green Building Council, Green Globes, and the Living Building Challenge all provide information and education to practitioners. This ensures that the Execution phase of adoption will lead to results that confirm the

value of sustainable design. Without support for Execution and without Confirmation, the momentum needed to sustain widespread adoption will not be sustained. Advocates of universal design need to study the sustainable design movement to learn how to build and maintain momentum for the adoption of the concept. There are several initiatives currently underway to implement similar initiatives in the field of universal design. One is the Flag of Towns and Cities for All Program developed and managed by the Design for All Foundation (designforall.org). Another is the Universal Design Standards initiative conceived by the Global Universal Design Commission (global-universaldesign.org). Supporting and participating in these initiatives should be a priority for all universal design advocates and experts.

It is important to note that there is major difference between adoption of sustainable design and universal design. The business case for sustainable design has been well established and achieving its goals is much easier to measure, e.g. energy conservation, waste reduction, carbon footprint. In the practice of universal design, we need to develop a better business case, with supporting evidence and better indicators of successful performance. This will make it easier to implement initiatives to increase adoption.

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Voluntariness or regulation: Building barrier-free residential communities

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In the absence of any legislative requirements for universal design in housing, the Australian Government is relying on the goodwill of the housing industry, and market-forces to build barrier-free residential communities.

This national voluntary approach has received widespread support and is currently considered by both government and community groups as a key strategy in the policy direction towards barrier-free communities. A program of education and incentives is aiming for all new housing to provide minimum access features by 2020.

Experience in other countries serves to question whether a voluntary approach will work. A recent study in Brisbane, Queensland asked developers, designers and builders "what got in the way" and "what might assist" them to provide minimum access features in their housing. They identified that, unless law required them, there was no incentive to change their current practices. There was minimal demand from buyers for universal design, and the risk to their profit was too high. They identified that, to meet the 2020 target, legislation that directed everyone to provide a minimum standard of access would be needed. They said it would also help if housing industry leaders challenged existing practices and demonstrated that universal design was profitable.

Global Perspectives and Reflections

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Universal design is an evolving concept and has synonyms. This article summarizes its knowledge base and offers a global perspective on its development. The state-of-the-art is reviewed with reflection on theory and practice. Finally, a framework is introduced and illustrated with an example.

The evolving concept and different synonyms

The concept of universal design has been evolving. From the mid-1980s to the beginning of the 21st century, universal design "has been changing from narrow code compliance to meet the specialized needs of a few to a more inclusive design process for everybody." (Ostroff:2001) Nowadays the widely adopted definition by the United Nations suggests that universal design not only means "the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design", but also "shall not exclude assistive devices for particular groups of persons with disabilities where this is needed." (CRPD:2008)

Globally there are two other terms used interchangeably with "universal design", i.e. "design for all" in continental Europe and "inclusive design" in the United Kingdom (UK). The adoption of different terms reflects, to a certain degree, the socially dominant models of disability or different approaches to disability studies. For example, the USA and Canada adopt a minority model which means people with disabilities constitute a minor position in society and they have been denied civil rights, equal access and protection (Goodley:2011); their prevalent term used in design is "universal design". In the UK disability is seen as a social construct, i.e. people with impairments are oppressed/-disabled by society: they are disabled people (Goodley:2011); the prevalent design term adopted by the UK is "inclusive design".

In addition to the disability rights movement, demographic change is another driver for universal design. There exists terms such as "transgenerational design" (Pirkl:1994) and "design for our future selves" (Coleman:2001).

The knowledge base and a global perspective

Existing literature on universal design tends to focus on: (Heylighen:2013)

- Attitudes and approaches to design
- On-going process
- Specifications of designed products

Dong (2011) summaries the building blocks of the knowledge base of this field:

- Theoretical models (e.g. design process and knowledge transfer)
- User data (e.g. different types of users, capability and contextual data)
- Best practice exemplars (e.g. design, business, education)
- Methods and tools
- Policy, standards and guidelines

Universal design has quickly gained a global reach. Countries like Norway even adopt it as a national strategy. In the USA, "Despite progress, universal design has not seized the American popular imagination, nor shaped the personal or professional identity of most designers" (Fletcher:2011). However, there is a burgeoning interest in universal design among students and young, socially conscious design practitioners (Fletcher:2011). In the UK, "Inclusive design is increasingly being recognised, by governments as a focus for social equality, and by business and industry as a tool for commercial growth." (Coleman et al.:2007) A good example is the recently launched GOV.UK (www.gov.uk), which provides an online portal for all citizens to find government services and information. In Europe, standards on universal design are under discussion at present.

In developing countries such as India, "people really need not designs, but capability of design" (Sandhu:2010), and "there is a need for an urgent and powerful UD policy intervention by the Indian Government." (Balaram:2010) China has the world's largest ageing population and design student population. It is likely that barrier-free design/design for the ageing population and universal design/inclusive design will run in parallel, and co-creation and social innovation will be key themes for the future.

The state-of-the-art and reflection on theory and practice

The themes of the recent international conferences on universal design and relevant topics give an indication of emerging issues. At the 3rd International Conference on Universal Design (Hamamatsu, 2010), the issue of universal design for the majority of the world was highlighted. It was pointed out that the BRICK (Brazil, Russia, India, China, Korea) countries had started to take universal design seriously. The Include 2011(London, 2011) explores "the role of inclusive design in making social innovation happen" and the Include 2013(Kong Hong, 2013) focuses on "global challenges and local solutions in inclusive design". The 4th International Conference on Universal Design (Fukuoka, 2012) declares that we need technology that creates "a world that we can all enjoy as equals" and through "joining in the concept of Universal Design we can each play a part in creating a safe and secure society for all." In the Ergonomics and Human Factors 2013 conference (Cambridge, 2013), Professor John Clarkson gave a keynote speech on "Design for our future selves – progress to date!" He summarised the five stages of the Cambridge Engineering Design Centre's 12-year journey through inclusive design research:

- **Stage 1.** Building the knowledge base – key message: "it is normal to be different"
- **Stage 2.** Understanding commercial value – key message: "inclusive design = better design = good business"
- **Stage 3.** Focusing on designers – key message: "effective guidance = informed decisions"
- **Stage 4.** Extending research through knowledge transfer – key message: "active champions = targeted innovation"
- **Stage 5.** What next? The future calls for: policy makers with a focus on people; business with a will to innovate; designers with skills to innovate; and customers with the desire to purchase.

Despite the progress of universal design, Professor Rob Imrie argues that "there has been little or no evaluation of its underlying principles, its theoretical and conceptual content, or the diversity of ways in which it is interpreted and placed into practice".

Reflecting on theory, we find that from an engineering design viewpoint: "an inclusively

designed product should only exclude the end users who the product requirements exclude." (Clarkson and Keates:2002). The inclusivity of any design is determined by its degree of exclusion. 'Countering design exclusion' is a key approach to inclusive design.

Reflecting on practice, the diversity of ways of universal design can be rendered by many forms of involving people in the design process, as described by (Fulto Suri:2007)

- **Design for people:** people are involved as users and consumers
- **Design with people:** people are involved as collaborators and participants
- **Design by people:** people are involved as creators and designers.

The Challenges Workshops pioneered by Julia Cassim at the Helen Hamlyn Centre for Design represent a good example of engaging designers and "critical users"(Cassim and Dong:2007) in a co-design process based on equality and mutual benefit.

A framework and an example

If we think 'design' as a process of examining a problem and creating a solution, then 'universal design' brings the perspective of real people into the process, inspiring a multitude of viewpoints and innovative ideas (Eikhaug et al.:2010). Universal design is people-centred design, and an interdisciplinary topic. "Users and different disciplines are brought in because of their knowledge" (Lid:2013). Figure 1 shows a framework developed by the Inclusive Design Research Group.

In the center of the framework is human, which has basic and higher level needs. Design must address these needs and be useful, usable, desirable and sustainable. The key to the process is "user involvement", engaging "different stakeholders", and "multidisciplinary collaboration".

Take "Fixperts" as an example. It is a project started in 2012 and quickly spread worldwide. It is about promoting creative and social values through design (www.fixperts.org). The project requires a fixpert (e.g. a designer), a fix partner (e.g. an older person) and a filmmaker to work closely together to solve a practical problem, to document and to share the design process. The author organized Fixperts projects in Brunel University, UK and Tongji University, China, and found it a great way to engage students with inclusive design. The project has a human-centred focus, and the design fixperts have to work with the fix partner throughout the process to identify the problem, develop and evaluate the solution. Because the final solution has to be practical, all stakeholders have to be consulted, and different disciplinary knowledge has to be brought in to inform decision-making. Although the solution is developed for a specific fix partner it can

Fig. 1: In the center of the framework is human, which has basic and higher level needs.

Design must address these needs and be useful, usable, desirable and sustainable. ***The key to the process is "user involvement", engaging "different stakeholders", and "multidisciplinary collaboration".***

often be useful for all, proving the philosophy illustrated by the late Bernard Isaacs: "Design for the young and you exclude the old; design for the old and you include the young".

Concluding remarks

To conclude: universal design is an evolving concept, it is often known as a set of design principles, but it is also a philosophy, a strategy, a methodology, and a process. We can use universal design as:

- an approach to appropriate design.
- a means of identifying design deficiencies.
- a method for innovation.
- a way to achieve social inclusion.

In the meantime, universal design needs better theoretical underpinning.

More diverse evidence is needed to prove its value and increase its uptake.

Universal design has great potential for application in different cultures and in local contexts.

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2 From accessibility to inclusion

An ethical perspective

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Does *universal design* promote respect for human dignity? One of today's most important challenges concerns the interpretation of human plurality. Universal design signifies that diversity in abilities in the human condition is to be accommodated. At a society level, universal design is based on equality and equal opportunities as values. For the individual this strategy should be linked to plurality, inclusion and self-respect.

Does *universal design* promote respect for human dignity? I will examine universal design as a strategy and principle in the perspective of human plurality. One of today's most important challenges concerns the interpretation of human plurality. Drawing on the philosopher Hannah Arendt I will argue that the concept of human plurality should be analyzed in light of inclusion and exclusion. From the perspective of disability, universal design is not planning and designing for disabled people but acknowledging diversity in abilities among citizens. The concept of disability implies differentiation. In this article, I will situate universal design in the context of different embodied perspectives and take a relational understanding of disability as a theoretical framework. I will argue that the universal design principle is valuable only when citizens' self-respect is supported.

Plurality as human condition

How can design meet up with a rich and comprehensive differentiation? The short answer is that it cannot. Universal design might be an oxymoron, a contradiction in terms (Preiser, 2009: 29). In the *UN Convention on the Rights of Persons with Disabilities* (CRPD), disability and universal design is defined in article 1 and 2. The term *disability* includes both individual conditions that in interaction with various barriers may hinder participation (CRPD, article 1). Discussed in an ethical perspective universal design involves values, knowledge and practice. The values are dignity, equality and equal possibilities.

The philosopher Hannah Arendt understands human plurality as a basic condition for human life; we are *humans*. She also interprets the right to have rights as a right to belong to some kind of organized community (Hannah Arendt, 2004: 297). According to Arendt, the right to have rights is grounded in persons as human beings, which has to do with acknowledging all persons are equal citizens. Arendt's interpretation of plurality as a condition is radical:

> Plurality is the condition of human action because we are all the same, that is human, in such a way that nobody is ever the same as anyone else who ever lived, lives, or will live.
>
> *Hannah Arendt (1998: 9)*

Due to this condition of plurality, there is a need to plan for diversity physically, socially and spatially. Design of public places and institutions can be a manifest expression of respect for all individuals as equal citizens. At a society level, universal design can be

interpreted as respect for human dignity. If separated from the human condition there is a risk that universal design may be reduced to a minimum standard and thus fail to develop its full democratic potential. I will also argue that there is a need to analyze universal design on different levels in order to differentiate between technical standards, ethics and experience of inclusion and exclusion.

One of the most important tasks in today's society is to create and build habitable worlds for all people throughout their life span. This implies that the starting point should not be a fiction of a normal, average person, but diverse in all aspects. In a population, people will always be of various ages and have different abilities. This plurality is a valuable plurality.

What does it mean that universal design is usable?

It can be helpful to analyze universal design on a micro, meso and macro level (Lid, 2012: 7):

Macro level	Ethical concept, concept of human, social justice
Meso level	Technical standard
Micro level	Individual experience. Accessibility and usability, citizenship

Fig 1. *An analytical approach to universal design and accessibility, which differentiates between a macro, meso and micro level.*

The micro level relates to different individuals, inclusion and self-respect. Accessibility and barriers are experienced by individuals with or without impairments. Universal design is not the best concept to use at this level, since what people experience, are accessibility and barriers.

According to CRPD article 2, universal design products, environments, programmes and services should be "usable for all people to the greatest extent possible". In order to examine if something is *usable*, we need to visualize individual persons. Experiencing access contributes to giving individuals a social basis for self-respect as equal citizens. *Usability* is a subjective term. If design is to be usable by all people to the greatest extent possible, there is a need for knowledge from a great number of different individual perspectives.

At the meso level, the fact that physical barriers hinder people from taking part in life and society as citizens is addressed by technical standards in planning and building regulations. Disability can emerge in concrete situations if technical standards do not include the perspective of people with impairments. In the Norwegian context, universal design is now implemented in several laws and regulations, for example in the Planning and Building Act. At a macro level, universal design is an ethical and political concept based on democratic values aiming at social inclusion. At this level, universal design expresses recognition of people as different and equal.

Priorities and dilemmas

The ethical dimension deals with questions of inclusion and exclusion. People live together with others in a common world. To live is to live among humans (Hannah Arendt, 1998). The most important and prominent dimension in universal design, as I approach the concept, is that the strategy can support all people's right to have rights and the possibility to live in and belong to communities. However, here is also an obstacle since it may not be possible to accommodate all individuals at the same time. Sometimes one must give higher priority to some and lower to others. Such priorities are of ethical importance and can be difficult to make.

One example is a public space where the pedestrian area is a slope ramp. The pathway is rather long due to the detailed specifications on level differences. An individual with mobility restrictions who uses crutches will face problems in an area like this, whereas a wheelchair user

with a power chair can manage such an area quite well. If there are benches in the area, the pedestrian who does not use a wheelchair can relax and experience recreation during the walk. If there are no benches, or if the benches are without armrests, fewer people can use this public area. Whether or not such a public space is universally designed depends on who is asked. If a priority has been made between benches with armrests or a well-designed ramp, there is an ethical responsibility to make this clear. Priorities should be challenged and evaluated in order to learn about who is included and who, if any, is excluded.

There is a necessity for more detailed knowledge from different individual perspectives. What is important to make explicit, is that one cannot avoid priorities. Universal design is not a God-trick that enables the planners and local and national governments to include all good intentions. Accomplishing universal design is often difficult, sometimes involving almost impossible choices, for example, should a toilet be small or big? If it is big, it may be difficult to find the functions. If it is small, one may not find space for oneself and one's individual devices. Probably there is a need for both in order to maximize flexibility through plural solutions, but sometimes this is not an option, due to economic, spatial or technical reasons. In real-world situations, one must adjust to local conditions with their technical and spatial limits.

Also individual factors influence how usable a product or an environment is. **The fact that individual bodies are different has been overlooked in universal design practices**. When linked to human vulnerability and disability as a human condition, universal design may contribute to the development of more inclusive environments and societies. There is however, a risk that the strategy will fall short of developing its democratic and ethical potential if the concept is detached from human embodied vulnerability. Rosemarie Garland-Thomson notes "recognition relies on a combination of identification and differentiation" (Rosemarie Garland-Thomson, 2009: 158). At a macro level, the ethics of universal design can be expressed as recognition of all citizens as equal.

According to the CRPD, disability is not just a social phenomenon: it is relational. Within the framework of a relational model for disability, universal design can be linked closely to both individual embodiment and the environment. Disability involves individuals' different bodies, human beings that interact with the social and physical environment. In analyzing when, and how universal design is appropriate, therefore the term *usable* and different individual perspectives are crucial.

Can *universal design* be experienced directly at an individual level? More research is needed in order to strengthen the scope for diversity. In doing this, dilemmas and antagonisms must be worked through seriously. Universal design must be contextual design rather than best practice-design that can be implemented regardless of the context. However, it is also important to be clear about priorities. Who is not included by the design solutions chosen? Who is included? Good examples are of profound importance; they fertilize our imagination, and should include both processes and products. Examples can expand the possibilities we see. However, good examples should not be copy-pasted regardless of context. What works in one context may not work as well in another.

“The fact that individual bodies are different has been overlooked in universal design practices.”

Conclusion

The ethical dimension in universal design relates to the individual and the situation. Universal design as a design principle can lead to a world where people are visible as different citizens. Universal design concerns citizenship, social inclusion, participation and human dignity on a structural level. However, the strategy is not infallible and needs further development and evaluation in order to be a productive tool for inclusion.

Put in a democratic context this strategy is valuable and vulnerable. It should be approached comprehensively and evaluated in light of different individual perspectives. Universal design has the potential to give scope and place for manifold people and thus let different people see each other as they are. As pointed out, Hannah Arendt emphasized the right to have rights as a right to belong to some kind of organized community. When what is practised at a meso level is in accordance with the values and can accommodate a rich plurality of individual conditions, universal design can lead to a more equitable and inclusive world.

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Creating an inclusive environment

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Universal design has not been adopted extensively within the design community. To increase adoption, we need to expand the original focus on design for usability to include attention to social inclusion, health and wellness, and differences in context.

These are two definitions of universal design:

"The design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design."
(Mace, 1985)

"....design for human diversity, social inclusion, and equality."
(Design for All Europe, 2008)

Universal design (UD) is an innovative concept, not because the idea is new but because it is perceived to be new by the majority of stakeholders. Research on the diffusion of innovations demonstrates that communicating the innovation better and making it meaningful to those who will implement it are two of the most important strategies for improving adoption (Rogers, 2002). Currently, universal design is perceived as "design for disability." The broader public has limited knowledge and interest in it because they do not see the relevance it has for them. Professionals still view it as a boring technical aspect of practice to be addressed after the creative work has been completed. Enhancing adoption requires communicating the concept in a way that is relevant to everyone beyond the early adopter group so we are not just "preaching to the choir."

As in the older definition above, the concept of universal design was originally focused on usability. Today, as expressed in the second definition, the emphasis has expanded to social inclusion in response to the increasing diversity of societies and the expansion of human rights movements. The first, and most widely used, definition reflects its roots in the disability rights movement. The second is more relevant to all citizens without ignoring people with disabilities. Its focus on social inclusion is, in fact, consistent with the current paradigm of disablement theory in which the outcome of interventions to ameliorate the negative impact of disability is both improving function and improving social participation (WHO, 2011).

The public and design professionals want to know what universal design means in practical terms – what they need to do to achieve it. The Principles of Universal Design (Connell et al., 1997; Story, 1998) sought to address that need:

- Equitable Use
- Flexibility in Use
- Simple and Intuitive Use
- Perceptible Information
- Tolerance for Error
- Low Physical Effort
- Size and Space for Approach and Use

The Principles have been used throughout the world since the mid-1990's. They have proven to be valuable for clarifying universal design for early adopters, but not as useful for expanding adoption to the broader professional community and to the public. I think this is because the Principles focus mainly on usability issues and do not clearly address other outcomes of universal design practice. More emphasis needs to be placed on social integration, or how to improve social participation of diverse groups by not only removing barriers but also providing positive support.

This will also help clarify the difference between universal design and compliance with accessibility standards. Below is an example of the difference.

Fig. 1 *A picnic area in the rural U.S. (Photo: Edward Steinfeld)*

The sign in Fig. 1 reads "Picnic Area for Handicap Only – Local Ordinance Prohibits Use by Others." It is easy to understand why this sign was erected and the law created. The picnic tables that were provided for people with disabilities in this park were in the parking lot, the most convenient place to get to from visitors' automobiles. When people with disabilities arrived, they found that the tables were occupied and none of the others were accessible. The local government solved the problem using the model of reserved parking spaces. This example demonstrates that conventional approaches to accessibility do not guarantee inclusion. In fact, they can often lead to exclusion as we see here.

Expanding Adoption

Putting more emphasis on social integration goals in the practice of universal design can help make UD practice more relevant, especially to other groups who often experience discrimination by design such as: ethnic minorities, women, low-income populations, and the LGBT community (lesbian, gay, bisexual, and transgender). It is important to note that demographic data demonstrates a significant association between disability rates and minority group membership, low-income and old age, thus extending the target population for UD beyond the original focus on disability. This is not only in keeping with its original intent, but will also help increase adoption by expanding the beneficiary population and improving the business case for adoption.

Fig. 2 *A ramp added to a suburban American home. (Photo: Edward Steinfeld)*

Social identity

Social identity, which includes both presentation of self and the perception of others, is a second important aspect of social participation. In universal design we cannot neglect the role of appearance and its impact on social identity. This photograph shows a very long, crudely designed wooden ramp in the front yard of a suburban home in a working class Buffalo suburb. A heroic effort was needed to provide an accessible entry to this home. The ramp is so out of context that it looks exceedingly awkward. The result is intrusive in the neighborhood, stigmatizing for the household and gives accessibility a bad reputation to professionals concerned with the visual character of places.

Even though accessibility provides access to resources for people with disabilities, the lack of universal accessibility restricts opportunities to participate in community life. So, practicing universal design implies going beyond home adaptations to design communities in which all homes are accessible. Urban design strategies that support social integration need to be deployed as well (Steinfeld and White, 2010; Steinfeld and Maisel, 2012). Features like walkable streets, mixed use neighborhoods, and windows facing pedestrians are ways to encourage walking, stimulate friendship formation, and improve security.

Social value

Social value plays an important role in adoption. There is a growing awareness of the connection between environmental design and health. Everyone puts a high value on health. Yet, health outcomes are generally neglected in current conceptions of universal design.

Universal design could have a greater emphasis on prevention of disability and wellness promotion. By emphasizing health and wellness, its relevance to the entire population will become more obvious and its social value will be increased. Attention to health issues in design is also a means toward overcoming health disparities based on demographic factors like income, education, race, and ethnicity.

Accident prevention is the most obvious health issue to address in universal design because it focuses on design for function. Rates of some accident categories are increasing but so are rates of many disabling diseases like asthma and depression that have not yet become important issues in universal design. There are many other important health and wellness concerns that should be addressed including infection control, access to healthy food, sanitation, air and water quality, and the promotion of active living. While there are initiatives within the design professions on all of these topics, the universal design community has been slow to make connections with these other groups. There is also an opportunity to conceptualize universal design as an umbrella concept that could help advance all these health and wellness initiatives.

To ensure that universal design is valued, practitioners have to respect the context in which it is implemented. The Principles of Universal Design and the leading definitions are strikingly silent about contextual differences. There are many sources of such difference, e.g. topography, economic development levels, cultural norms and local values. Increasingly, a high value is placed on preserving cultural resources like historic buildings and nature. Attempts to enhance accessibility, however, often conflict with these two goals. Universal design needs to address this conflict. An effort has to be made to find creative solutions that increase the social value of accessibility by reinforcing other social values.

An important barrier to the adoption of universal design in middle and low-income countries is the perception that it is idealistic, expensive, or an imposition of Western values. It is unrealistic to assume that the same design strategies can be used everywhere. In particular, the level of economic development is an important determinant of priorities. Stainless steel grab bars are not that important if one does not have access to safe toilet facilities at all. In some places, achieving the level of accessibility required by Western norms is unrealistic and counterproductive. Refugee camps and informal settlements are two examples.

The growth of a global service economy has resulted in the development of a new domain for design activity called "service design" in which a service like transportation is conceived as a complex set of practices, products, and environments that can be designed together. Service design demands a continuous quality improvement approach. It is a process rather than a product. We like to say that universal design is more appropriate when stated as a verb – universal designing. Thinking about universal design this way accommodates resource limitations, the time that may be needed to change long held cultural attitudes, and changes in priorities due to socio-economic trends.

Conclusion

My colleagues and I believe that increased adoption of universal design can be achieved by expanding the emphasis on social participation, incorporating a health and wellness focus, recognizing the role of context, and conceptualizing universal design as a process rather than a set of rules. To accomplish this we propose the following definition of universal design.

A process that enables and empowers a diverse population by improving human performance, health and wellness, and social participation.

To accompany the new definition, we developed eight Goals of Universal Design. Each one

embodies a clear outcome and each is accompanied by an example. The examples span many domains of design practice. A more detailed version of these Goals with examples of each can be obtained in our recent book, Universal Design: Creating Inclusive Environments (Wiley & Sons, Inc.).

Goal 1: Body Fit – Accommodating a wide range of body sizes and abilities
Goal 2: Comfort – Keeping demands within desirable limits of body function
Goal 3: Awareness – Ensuring that critical information for use is easily perceived
Goal 4: Understanding – Making methods of operation and use intuitive, clear, and unambiguous
Goal 5: Wellness – Contributing to health promotion, avoidance of disease, and prevention of injury
Goal 6: Social Integration – Treating all groups with dignity and respect
Goal 7: Personalization – Incorporating opportunities for choice and the expression of individual preferences
Goal 8: Cultural Appropriateness – Respecting and reinforcing cultural values and the social and environmental context of any design project

Universal design is not just about technical details. It involves a process that starts with policy, moves on to project conception, is implemented through design process, realized in design and construction, and continued through management and business practices. Above all, it must have benefits that will be valued by everyone. To advance adoption of universal design, we need to make those benefits broader and more understandable.

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Bridging the Gap between Theory and Practice

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To bring Universal Design into the mainstream of public policy and planning requires a significant cultural shift.

Necessary actions include disseminating evidence of the social and economic benefits of Universal Design and of the costs of failure to adopt its principles.

Using the force of law is also crucial, as a direct requirement or as a condition of financial support.

A strong economic case

In the countries of the European Union, public expenditure on age related issues was at 23.1% of GDP in 2007.

Understanding Universal Design

The fundamental point of Universal Design is that everyone benefits from it and no one is disadvantaged.

To make sure that we are taking the right approach to achieving Universal Design we need to look first at those people who are most vulnerable and who are currently most likely to be excluded from many aspects of everyday life.

If we can create environments in which older people and those with disabilities can live independently and with confidence, we will have met the needs of the wider population across the generations.

The Economic Case

There is a strong economic case to support Universal Design. The demographic trends are one compelling factor. In the countries of the European Union, for example, public expenditure on age related issues was already at 23.1% of GDP in 2007 and it is expected to continue to rise.

Against this background, the strong correlation between age and disability is another key factor. Some two thirds of people with disabilities are over retirement age.

There is also a very high cost to supporting those people who have become housebound. The range of services that have to be brought into them at home – from meals to medical attention – all carry a high price tag.

The other traditional solution to reduced mobility, providing separate or special transport services, is also simply no longer affordable in most economies with the ever growing number of people in need. Solutions that meet everyone's needs – based on Universal Design principles – provide the most effective and cost effective way forward.

The Social Case

It is well established that retaining independent mobility into old age is crucial in sustaining continued physical and mental health and wellbeing. There is evidence of rapid decline among those older people who are no longer able to go out alone even within their own neighbourhood.

The reduction in the quality of care (for example less hygienic conditions for medical attention at home) and the reduction in nutrition (for example from fewer food choices) is also well documented.

Another factor that is becoming increasingly significant is loneliness. With changing social patterns, more and more older people are living alone. In the UK, for example, this applies to more than 3.7 million people aged over 65. The ability to go out and to meet other people, if only buying bread in the local shop, is an important factor in maintaining quality of life.

The Political Case

Happily, at the political level, there are also strong factors supporting Universal Design. The urbanisation of the world's population is one key driver. Since 2008 more than half the world's population live in urban areas and that number is growing.

There is also pressure to create "liveable" cities that put people before motor vehicles and that allow older people to stay in their own homes within the city. This means that there is a close link between the "sustainability" or green agenda and the concept of Universal Design. The World Health Organisation's work on Age Friendly Cities further reinforces the idea that people should not be forced out of their lifetime environments in old age because the city cannot adapt itself to their changing needs.

The "grey" vote is also a major factor in the minds of politicians. They cannot afford to alienate the growing army of ageing baby boomers and they are well aware that the current generation just reaching retirement age are likely to have much higher expectations of continuing active and independent living into old age.

Creating the Right Culture

In spite of all these strong policy drivers in favour of Universal Design, there still remain many barriers to be overcome. First is the reality that in many cities around the world, old infrastructure and economic difficulties make it difficult to eliminate or transform inaccessible environments. There are also deeply rooted cultural stereotypes that dictate design.

"The only affordable way to provide for the needs of our increasing populations of older and disabled people is to design and build infrastructure and systems that meet everyone's needs throughout life from the baby buggy to the wheelchair."

For change to become a reality, there needs to be a shift both in the perception of affordability and in the traditional thinking on planning and design.

Costs and Benefits

A major issue in these difficult economic times is that accessibility is always regarded by the public and private sector alike as a cost rather than as a benefit. As long as that perception prevails it will be difficult to change the view that disabled and older people are better treated as a minority population needing a minority solution.

The key to bringing about change lies in a shift of economic perception so that universal accessibility, which removes the need for separate or special systems, is seen as a universal benefit in economic as well as in social terms. One way to help achieve that shift is to make a clear link between the accessibility and sustainability or liveability agendas that have already captured political imagination in many places.

Fundamental changes in policy and fiscal approaches and in public behaviour are already taking place in recognition of the pressing issue of climate change and the need to address pollution and congestion in cities. A similar cultural shift is now needed to embed the notion that the only affordable way to provide for the needs of our increasing populations of older and disabled people is to design and build infrastructure and systems that meet everyone's needs throughout life from the baby buggy to the wheelchair.

Carrot and Stick

Alongside the need to change economic perceptions is an equally important need for practical demonstrations of commitment to and belief in accessibility as a non-negotiable condition of public funding at international, national and local levels.

The United Nations Convention on the Rights of Persons with Disabilities makes clear and explicit reference to the need to follow Universal Design principles. Article 4 requires signatories to: "undertake or promote research and development of universally designed goods, services, equipment and facilities ..... and to promote their availability and use, and to promote universal design in the development of standards and guidelines". And yet in many countries that are signatories to the Convention there is little evidence to date of this concept being embraced widely, if at all.

There is some evidence of good practice. For example, the European Commission makes a clear link between availability of its Structural and Cohesion funds to finance major infrastructure projects and an understanding of principals of mainstreaming and inclusion. However, such commitments are still the exception rather than the rule. The World Bank, for example, sometimes makes a link between funding and accessibility but not on a routine basis.

Training

One of the simplest and most cost effective ways to bridge the gap between theory and practice in delivering Universal Design solutions is by training.

It is currently possible for most professionals in most countries – architects, planners, designers and engineers – to qualify and practice without any knowledge or understanding of accessibility issues. This gap in understanding means that every day plans are drawn up, buildings constructed and transport systems authorised with life spans of decades or more, but without the automatic and non-negotiable inclusion of Universal Design principles.

Introducing accessibility in general and Universal Design in particular, as an integral and compulsory part of professional training would make a significant contribution to changing the shape of our future environments for the better. In particular it would help to ensure that older people would no longer face the trauma and upheaval of relocating or giving up their own homes because the buildings, transport systems and environment around them lack the flexibility to meet their changing needs.

Monitoring and Evaluation

In the meantime, there is a need for constant vigilance and monitoring of infrastructure projects and all other major public investment. There are so many examples across the world of poor design resulting in limited accessibility. This means that older and disabled people are either excluded from the shopping mall, hotel or railway station or they have to be accommodated through some separate or special arrangement that is both costly and undignified. Accessing a restaurant via the kitchens or a public building by means of the goods lift are everyday experiences for many people with disabilities.

Evaluating how well access solutions are working is also vital. There are too many examples of ticking the accessibility box without taking

the time or trouble to see if access needs are actually met.

To take one example, low floor buses fitted with ramps or lifts are now very common all over Europe. It is widely perceived that we have solved the access issue and that wheelchair users and others can now travel readily by bus. Those who take this view often have the comfort of statistics that will tell them that 90% or even 100% of the local bus fleet is accessible. What is not counted, however, is how many wheelchair users, blind people and others with mobility difficulty are able to get from their homes to the bus stop, board the bus and travel with confidence.

The barriers that remain may be poor pedestrian infrastructure, poor design or location of bus stops, lack of accessible information, inadequate driver training or a combination of all of these factors. It is only when we talk to older and disabled people in a local area to find out if they are travelling, and if not why not, that we can have a clear picture of what needs to be done.

One clear example is in the growing introduction of shared space in cities where pedestrians, cyclists and motorists use the same area without physical demarcation between them. With good design and careful planning such schemes can bring benefit to everyone. Too often, however, they fail to recognise the very real fears of people with low vision or limited mobility. On-street surveys after introduction will confirm that everyone is happy. But no one is reaching out to those who are no longer on the street because they are too frightened to go out.

Without understanding the difference policies or practices make on the ground, we are simply paying lip service to accessibility and to the notion of Universal Design.

Conclusion

Closing the gap between theory and practice need not be a costly or complicated matter. However, it does require a culture change or paradigm shift among politicians, economists and practitioners. Above all it means changing the status of accessibility from cost to benefit by looking at what it would cost not to introduce Universal Design principles.

Behind that fundamental shift we also need to see clear and consistent training, monitoring and evaluation so that those in positions of responsibility both understand what needs to be done and are able to effectively measure how well it is working.

The demographic trends mean that the time for change is now. The social and economic imperatives of failing to meet the needs of older and disabled people are clear and compelling.

Interpreting universal design in architectural education

Links between design principles for application in socially inclusive settings

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Educational strategies for understanding the universal design conceptual framework are still not clearly defined. Basically, the insertions about themes, exercises and lectures are related to accessibility, usability and wayfinding situations in public environments only as additional concerns to general design issues.

This article addresses educational strategies that have been adopted in the school of architecture at Universidade Federal de Minas Gerais, Brazil.

Understanding the principles of universal design – a conceptual model

There are seven universal design principles. We may remember them very easily if we consider the time sequence in which the development of knowledge about accessibility took place and the strong advocacy of certain groups of users. At first, the principles "size and space for approach and use" and "low physical effort" can be recognized as related to the needs of wheelchair users and other physically impaired people. The principles "simple and intuitive use" and "perceptible information" can be related directly to the needs of blind and other visually impaired people. The principle "tolerance for error" can always be regarded as an important dimension to remind us that we are human. Such a principle can be related to any user group. The principles "flexibility in use" and "equitable use" are principles that frame individuality in terms of human experience. We can only think of equality if someone has enough control of the environment in which one operates. Considering the diversity of human conditions, size and abilities, a particular environmental feature may fit in one's set of personal traits, resources or preferences only if it contains enough flexibility for adjustments, expansion and versatility of applications. The number one principle, equitable use, refers to accommodating everyone, i.e., leaving no one outside or behind other people's needs or interests. It may be considered the principle that upholds the essential human right of social inclusion and full participation.

When architecture students try to learn about universal design they may get information online or elsewhere that focuses on users' interface with objects of everyday life. The usability of design products tends to assume much more importance in such examples than accessibility or wayfinding issues simply because of the scale of user-environment interaction. However, architecture is much more than a collection of designed objects. Architecture is language. When we approach the human experience through built environments by focusing on the architectural elements, equipment and installation only, we act as if we would want to master an idiom metaphorically by studying words and letters. We must go beyond that. We must develop grammar skills and aim to write poetry. Therefore, architecture students may feel confused when trying to bridge the conceptual gap that connects interior environments, buildings, landscapes and urban settings with scissors (although they are specially design to reduce stress of thumb and indicator), bottle tops (although they are designed for one to twist it open easily) and handles of kitchen tools (although they are carefully designed to fit comfortably in both strong and fragile hands).

There are seven UD principles but they are not necessarily ranked in any order

Fig. 1 *Three vertical displays of the seven principles of universal design indicate that the numbers from one through seven imply a certain order. However, universal design principles may be considered in other arrangements that do not suggest linear order, like setting them in a ring. Source: the author's collection*

Although the seven principles act collectively and are integrated to a point that is difficult for a student to distinguish when or whether one principle stands out while the other is in the background, the available information about the principles ranks them from one through seven as if the characteristics of each make it a single isolated entity. The challenge is not only for an architecture student to remember each principle and its guidelines but to understand which principles are better applicable to certain problems in the context of person-environment interface as well as person-person social interaction.

A conceptual model establishes a scheme that organizes the universal design principles in a ring of mutual relationships. Certainly, depending on the context of user-environment fitting problems, the mutual relationships among principles may vary a bit. This paper illustrates a particular configuration that allows architectural students to explore the links between pairs of principles at least, thus reducing complexity and enriching class discussions about potential design solutions at the level of buildings and urban environments.

UD principles can be organized according to a conceptual scheme that may form many rings as links

Fig. 2 *Whether the very nature of the principles of universal design is holistic their mutual relationships may vary according to the context of design applications. By organizing them in a ring format, students may see multiple influences particularly in pairs of the principles. Their assignment is to interpret architectural applications of the principles that act in pairs. Source: the author's collection*

The following are the links between selected pairs of principles as organized in a counter-clockwise sequence: (a) equitable use and flexibility in use; (b) flexibility in use and tolerance for error; (c) tolerance for error and low physical effort; (d) low physical effort along with size and space for approach and use; (e) size and space for approach and use combined with perceptible information; (f) perceptible information along with simple and intuitive use; lastly but not less important, (g) simple and intuitive use and equitable use. As we see, there are also seven links or conceptual overlapping areas. Combining principles in pairs may allow students of architecture to interpret the links as "creating grammar" for appropriate application in "architectural language."

This particular framework was based on premises embedded in Gestalt principle and the Ecological model.

In a ring, links between UD principles can be understood by consideration of overlapping areas.

Fig. 3 *In a ring configuration, overlapping areas between pairs of the principles of universal design may define other concepts that clearly indicate whether universal design applications address a particular design problem in architecture. Source: the author's collection*

In such a conceptual framework, the relationships between the whole and its parts as well as the relationships among parts allow us to achieve general understanding about their meaning as the big picture that includes missing information. In fact, Gestalt principle for visual perception sustains that our mind constructs invisible links between isolated entities as long as the meaning of relationships is clear. Therefore, universal design is an expression of user centered design with the greatest emphasis on the symbolic meaning of users' experience in built environments, through social interaction, accessibility and usability. User centered design does not imply that the best design solutions are envisioned by users only. It approaches design from a bottom up perspective, which addresses particular aspects of the user experience as scenarios. Architectural design students may compare scenarios with design guidelines that were created for the seven principles of universal design.

The focus on relationships between pairs of universal design principles challenges students to identify the best concepts that match universal design guidelines with scenarios of

user-environment interface as overlapping areas of mutual influence.

For instance, the principle of "tolerance for error" may sound a bit subjective and ethereal for architecture students matching it to a particular design problem as related to use of the built environment. Certainly, it is quite clear for students to consider tolerance for error on the scale of objects as, for instance, in the case of functionality of the backspace key of computer keyboards, since typist mistakes can be fixed. However, "tolerance for error" lacks direct relationships at the scale of building sectors and urban spaces. When a student looks at the relationship between "tolerance for error" and "low physical effort" as a particular scenario of user activities in a certain environment, the ideas about "safety" related issues become more evident. Also, the notion of "adaptability" stands out when students consider the various adjustments that are characteristic of accommodating diverse users' abilities. Thus, when users of all ages and abilities are in environments that save physical efforts and reduce stress while accommodating adjustments in environmental setting, there is a strong chance that such users may experience less fatigue during comfortable usage of environmental features.

The principles "equitable use" and "flexibility in use" may also be closely related. Such overlapping areas may help students examine applications for the notions about users' autonomy, spontaneity and self-reliance or independence. It is by the "power to choose" that users are free to explore environmental configurations and get involved in social activities.

Other overlapping areas in this ring configuration of universal design principles are "user friendly interface" (considering spatial configuration and features that enhance equitable human experience to make it simple and intuitive); "wayfinding cues" (exploring the cognitive structure of human perceptual navigation as a natural mix between perceptible information and simple and intuitive use); "human scale" (where perceptible information meets size and space for approach and use"); and "proximity" (considering that size and space for approach and use are dimensions that become more effective when they reduce physical effort to its minimum).

The spatial representation of the principles of universal design is an important assignment for students to practice their design skills as both understanding about mutual relationships among UD principles and developing a participatory decision making process in which everyone in class tries to reach consensus. The goal is to develop a three-dimensional installation for an exhibition of students' work products at the main lobby of the school of architecture, UFMG. On seven boards, each displaying incomplete information about specific universal design applications, the set of posters forms a cylinder.

A spatial representation of the principles of Universal Design

Using simply metaphor and analogy, the representation of UD in a three-dimensional installation can be obtained by making a set of seven boards that forms a cylinder. Each board contains specific ideas that explain not only one of the principles in detail, but also includes information about complementary concepts and a bit of other principles.

Contemplating the principles of Universal Design

The user is at the center of the cylinder as he or she is the focus of UD applications. Each principle is displayed at the same distance from the user who decides where and how to focus his or her attention. That demonstrates no hierarchical powers among the Principles.

Fig. 4 *Two images illustrate the reasons for the arrangement of posters about universal design application in a ring. The separation between posters allows users to reach the center of the installation where users may be in full control to access information. Source: the author's collection*

Each poster is a part of a bigger picture and that makes sense when a visitor looks at the collection and focuses on the information between illustrations and key statements.

Each board supports two posters: one of them faces inwards to the ring of poster boards, and the other, outwards. The outward surface of every poster displays characteristics and general guidelines for the application of the universal design principles. The inward surface of every poster depicts images of case studies with key statements that explain the students' interpretation of the conceptual overlapping areas between pairs of UD principles in the context of case studies. The cylinder diameter is nearly 4.5 meters (14 feet 9 inches) long. The poster cylinder includes seven even gaps as doorways (entries of 80cm or 32 inches wide) that invite visitors to be at the center of the ring installation.

During public exhibition, visitors who enter the ring of boards may contemplate data about the architectural application of the universal design principles for specific aspects of case studies. Considering it a metaphor that expresses user empowerment to access information about "user centered design," each user will be free to focus their attention and choose illustrations and key statements in the overlapping areas between pairs of universal design principles.

What users will see are pieces of graphics and text information that are combined into a set of posters as units that form a whole.

An important challenge for students is to select views of their digital architectural models of specific case studies that best explain the application of universal design principles as new concepts in the overlapping areas. The result will be a collection of images about different environments. Students will be successful in illustrating their ideas only if class teams work together in collaboration for the construction of the final assignment.

The approach to inclusive society as result of universal design

Initial classes include lectures about influences of design and technology in directing the trend towards the development of inclusive societies. Students learn that parallel lines exist for a new wider definition of the profile of users who benefit from more socially inclusive design ideas. They also learn about demographic shifts with the expansion of the ageing world population. In this framework, disability must be considered as a temporary condition that affects everyone on different levels and that it may be eliminated through adoption of proper assistive technology, accessibility implementation and maintenance, as well as socially inclusive practices for flexibility in the management of building, transportation and information systems. The scope of universal design is defined as the point for balance in the middle ground between ethics and aesthetics. Thus, social inclusion concerns are less effective as cultural expressions when they do not embody artistic values of shapes for users physical and psychological comfort. On the other side, aesthetic improvements are less worthy of consideration in situations where poor accessibility and usability of built structures are prevalent. In short, the implementation of beautiful high end technology for only a few in the population may be considered a waste of social resources if the variety of user abilities, needs and concerns does not allow the whole population to experience social justice.

Plenary discussions

In the class work for development of interpretations about universal design principles as applied to architecture, most discussions are in the realm of creating a shared idealistic view for the architecture of the future. That means the consideration of benefits from universal design is widely applicable to all initiatives for improvements of design practice on the scale of buildings and city environments as that becomes the ultimate trend of the continuous process of development. Universal design becomes the object of desire of everyone in inclusive societies.

Due to time restrictions, the methodology does not include simulation exercises for students about the experience of disabilities during user performance in the built environment. However, class activities encourage students to speak up about their critical view of specific disability related problems. In fact, class activities focus on the last stage of simulation exercises, which involves group discussions of participants sharing their shift of perception about environmental conditions for someone to ride on a wheelchair or to rely on a cane for wayfinding.

Students' work evolves in cycles of peer critique sessions combined with the deconstruction of prejudged concepts about building types and the framework about universal design principles. Those are important techniques for students to explain their interpretation about the contextual balance between aesthetics and ethics in problem statements and required solutions.

Constant discussions in class are essential for students and the instructor to clarify controversial issues regarding problem statements of definition; the impact of problems in particular profiles of users' abilities of adaptation; and potential design solutions that may accommodate everyone based on the premise of addressing the needs of people with mobility or wayfinding problems first and then expanding design applications to accommodate everyone. The dynamics of class discussions also stress the importance of sharing reflective thinking with distinct user groups in mind as if they were present, participating in class activities.

Conclusion

Universal design applications by studio classes in architecture depend on creating a structure for innovative conceptual programs in architecture and the adoption of an unusual approach to social inclusion through design. Although students become familiar with the operational value of guidelines about the seven principles of universal design, they learn to work collaboratively and to interpret those principles during the development of varied case studies that focus on accessibility and wayfinding issues and to apply ideas that highlight overlapping areas. Studio classes have demonstrated that the conceptual overlapping areas help students understand the holistic nature of universal design applications.

This is a shortened version of a longer article that describes the content of case studies, which can be found at www.deltanettet.no

I have never been universal

Dr Per-Olof Hedvall [Certec, Department of Design Sciences, Lund University, Sweden]

Why Universal Design?

In 2009 Simon Sinek made a thought provoking presentation on TED (www.ted.com) where he highlighted the importance of starting with "why" (Sinek, 2009). One of his main points was that great leaders inspire action by telling us what motivates them and what they believe in, not by describing what they do and how they do it (Figure 1).

Fig. 1 *The Golden Circle (Sinek, 2009).*

The Activity Diamond

Fig. 2 *The Activity Diamond (Hedvall, 2009).*

Sinek's observations and the examples he gives are interesting. In my own research I have benefitted greatly from a theoretical framework for activity: Cultural-Historical Activity Theory (CHAT) (Engeström, 1987; Leontiev, 1978; Vygotsky, 1978). According to CHAT, all activities have motives – a "why". Based on this framework, I have elaborated a motive-driven conceptual model called "The Activity Diamond" (Hedvall, 2009) (Figure 2). With it, different aspects of accessibility and diversity can be captured, described, and, most importantly, systematically related to each other. The model is based on four interrelated sets of factors and is situated in time and place. Conceptually, the Activity Diamond captures an activity system (Engeström, 1987) that is changing and developing over time. This means that it can handle both historical developments and instantaneous snapshots of an activity system.

The Activity Diamond portrays activities, where the outcome of what a person does is mediated and thus influenced by the artefactual, natural, and human environments. The subject in the model is often an acting individual, but can also be a group of people such as a family. The object of an activity is related to the will and needs of the subject. It is the goal determined by the motive behind the activity (Kaptelinin & Nardi, 2006) such as getting better grades, learning to read, looking for information on a web site or going out for a cup of coffee. Artefacts are everything human-made – such as concepts, computers, languages, buildings, legislation – along with their respective affordances (Gibson, 1986; Norman, 1988) and resistances of the desired outcome. An example of an influential factor in the natural environment is sunshine, which can make it hard to see what is on the screen of a smartphone. The human environment includes all the people or groups of people that influence the activity at hand: family, personal assistants, work colleagues, and larger sectors of the population that are involved in or otherwise affect attitudes, norms, and expectations associated with an activity.

UD is about how we want to live together

Universal Design (UD)(Steinfeld and Maisel, 2012) has been under development for more than thirty years. In Europe, Design for All and Inclusive Design have had a larger impact than UD. There are variations between the three and the practices that have evolved around them, but their underlying mind-sets are more alike than different. To a large extent they share the "why": a future that includes people of all ages and abilities.

In the *Convention on the Rights of Persons with Disabilities*, the United Nations states that it is the obligation of the States Parties to enable people with disabilities to enjoy fully "all human rights and fundamental freedoms" (United Nations, 2009, p. 2). This is a challenging reason to invest in diversity and UD.

However, UD is not only about people with disabilities. On the contrary, it concerns everyone. UD is now starting to attract interest and gain adoption in mainstream development. If UD works, then lots of people in diverse situations and with different purposes will have positive experiences from universally designed solutions and benefit from them. This for instance, can include parents out in town with prams who can easily avoid stairs, if they encounter them at all. Over time, people will start to expect UD features in their everyday lives, be they online, at school or work, out in town or at home. Slightly less friction in everyday activities can add towards the critical mass where UD is eventually included in ordinary design without being considered a response to special needs.

UD beyond special needs

There is an inherent contradiction between diversity and "special" needs. When thinking in terms of diversity, everyone has unique needs and resources (Jönsson, 2006). There is a risk that labelling some needs as "special" leads to thinking in terms of separate, special solutions. By embracing diversity and taking this as a starting point, UD has the potential to offer different thought patterns.

In my keynote lecture at UD2012Oslo I tried to pinpoint the tension between the individual and the universal, a discussion that goes back at least a couple of hundred years to Hegel at the beginning of the 19th century. Because of that, I called the presentation "I have never been universal". I wanted to stress the person's own perspective, and told a story from my own life in a wheelchair involving the Swedish X2000 train as an example.

A couple of years ago three of my colleagues and I were on our way to Stockholm from Lund, about four and a half hours travel by train. We decided to book first class tickets since we wanted to use the time for a meeting. That way we would be able to sit facing each other and in a rather quiet part of the train. The day

before we were leaving, I called the Swedish Railroads to confirm the arrangement. I then was told that I could not sit in a first class car; the only (!) place in the train for a person using a wheelchair was in car six, seat two. I had used that place many times before and knew exactly where it was and what it entailed in regards to my hope for the journey. Car six, seat two is located in the family car. The seat is right next to the lavatory and quite close to the exit. This is also the place for larger luggage. This means that you are seated where people are coming and going all the time on their way in or out of the toilet. Quite often there is a lot of luggage as well. Together, this makes for a noisy environment with frequent disturbances that make it impossible to work.

> “If Universal Design works, then lots of people in diverse situations and with different purposes will have positive experiences from universally designed solutions and benefit from them.”

The X2000 train is a good example of embedded values, attitudes and expectations. These are built into the train. A person in a wheelchair is not supposed to travel in first class and not expected to have work to do. The train is considered accessible since it is able to transport a person in a wheelchair from point A to point B, but the traveller’s experiences can be quite different, both in terms of accessibility and participation. In this case, I could not participate in the meeting and my colleagues kept interrupting their work to walk over and chat with me, since the situation felt strange to them as well.

When examining our built environment it becomes apparent that the artefacts in it are children of their time. The X2000 train is just one example. A one hundred year old building is probably less inclusive than a new one. The spirit of the times back then was quite different from today’s. When houses were designed, current values crept in during the process and became embedded in the building. This is why it is important to pay extra attention to the attitudes, norms, and expectations when creating new artefacts. Once the values are embedded they are often hard to change, which leaves people with hindsight-based compensatory adaptions as the only option. Again, starting with the “why” – the values – can lead to awareness and change.

Relational UD

Lid (2012) describes UD as relational, dealing with both the individuals and their environments. In my research I have found it useful to make an analytical distinction between the situated environment-relative and the relation between the individual and the environment that evolves over time, that is, between what is experienced in a concrete situation and what is lived through over longer periods. I have dealt with this by drawing on CHAT, which is about a person acting in a cultural-historical context and can handle both what happens in the present and future developments.

People often plan what to do before they go about doing it, but they often have to change according to what happens in the situation (Suchman, 2007). A person who over time gets used to managing in different situations may be so influenced by her experiences that she also succeeds the next time. Her expectations concern both herself and her human and technological environment, and her anticipation (Nadin, 2002) of the outcome will affect how she approaches new activities as well.

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Examples

We can discuss what universal design really is; philosophical and ethical justifications for designing for a diverse population. But it is the specific projects and results that people eventually meet in their everyday lives, which are essential to our success or failure in designing environments and services so that as many as possible can benefit from them. Certain conditions, however, can not be transformed to meet the requirements of universal design. Here we present some projects for further inspiration for the work of universal design and inclusive society.

Mentality Shift in Public Transport

– from physical accessibility to psychosocial inclusion. An example from Transport for London.

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Previously, the emphasis of accessibility and inclusivity research and improvements schemes has been on the physical elements of accessibility. While these are certainly extremely important, the outcomes of this research suggest that psychosocial issues are equally, perhaps even more, important. If aiming to achieve a truly inclusive and fully accessible journey 'experience', a 'mentality shift' in prioritising psychosocial issues is needed.

Public transport – the new climate

Public transport is facing major challenges in the current economic and social climate; a considerable rise in demand for public transport from an ageing population that is mainly dependant on public transport and is increasingly in need of specialised and door-to-door services. The above challenges double when one considers the raised public awareness and the pressure from user organisations to improve the equality and quality of public transport for all.

Public transport providers need to respond to increasing demand for service provision, both in terms of volume and diversity of service users. Transport for London (TfL), a major public transport provider in the UK, is currently facing oversubscribed door-to-door services and an increasing demand for accessible and usable public transport by conventionally marginalised groups such as older people and people with disabilities. Issues of accessibility, reliability and quality of service are key indicators that are sometimes in conflict and need to be revisited. There is a need to keep the quality of service consistent while at the same time redefining and prioritising the areas of focus and improvement.

Public buses – the most accessible service

Buses will continue to be – probably for many years – the main and only form of public transport that can be accessible to almost everyone (London TravelWatch, 2010). There is also evidence that bus services are often more frequently used by disadvantaged or more vulnerable sections of society, therefore poor performance is more likely to impact on these groups (London TravelWatch, 2009). Thus, the bus service proves to be the single most powerful transport tool in terms of inclusivity and equality potential and provision in a mega-city like London.

There have been great improvements in terms of making buses fully accessible. In London, all buses are now low-floor vehicles and have a space for one wheelchair (Transport for London, 2011). However, an 'accessible bus' does not necessarily guarantee an 'accessible bus service'. An accessible bus service requires not only an accessible bus and an accessible bus stop but also an empathic well-trained driver and a user-friendly environment.

Accessibility challenges in public transport – three-fold issues

Commissioned by Transport for London (TfL) and a local London borough, a research project investigated issues associated with the accessibility and inclusion of bus travel in London. For the purpose of this project, a mobility-challenged person was defined as:

> A mobility challenged person is someone whose mobility has been challenged due to age, physical or mental impairment, or an external physical condition; each of the above could have substantial and long-term adverse effect on the person's ability to use public transport.
>
> *(Nickpour and Jordan, 2011)*

Fig. 1 *Key stages of a bus journey*

Based on the access audits conducted, the journey was broken down into the key stages shown in Figure 1. The findings, based on a diverse range of primary and secondary field research methods, suggest accessibility and inclusivity issues affecting public bus services fall into three broad categories.

- **Physical issues** are to do with the design of the bus and the built environment and are the 'typical' issues considered when looking at accessibility. Findings suggest the key physical barriers identified include getting to the bus stop, space availability and priority on bus and ramp technology and reliability.
- **Psychosocial issues** are the 'soft' issues associated with the quality of people's travel experience. Findings suggest the key psychosocial barriers identified are ambience, awareness and empathy and communication.
- **Operational issues** concern the running of the service and cross-organisational strategies and regulations. The key identified operational barriers are Key Performance Indicators (KPIs). Public bus service KPIs currently appear to focus only on efficiency rather than quality, inclusivity and enjoyment of service.

Psychosocial issues – a closer look

Various observational and immersive methods used uncovered a number of difficulties – mostly psychological and social – that users faced. These included:

- **Uncertainties**
  There were many aspects to this including uncertainties as to whether users would be able to get on and off the bus OK, whether they would have a long wait at the stop and whether their interactions with others would be positive.
- **Overcrowding**
  As more and more people are using buses, overcrowding is becoming an increasingly problematic issue. Even if it is possible to board, overcrowding can make it specifically difficult for older people to get to a proper position.
- **Off-putting stories**
  In some cases, participants were put off using the bus because of stories they heard about other people having bad experiences, in particular stories of violent or frightening incidents. These stories may have been told to them by friends or they may have read or heard about them in the media.
- **Negative experiences with drivers and other passengers**
  The behaviour of drivers or other passengers could act as one main source of annoyance or intimidation. Some negative experiences with drivers included inconsiderate driving, having a perceived unfriendly or surly attitude towards the user, or ignoring mobility challenged passengers at the bus stop. Loud teenagers using foul language, loud music or conversations on mobile phones, inconsiderate behaviour when getting on and off the bus, and the risk of encountering drunk or threatening people in the evening were among other issues raised.

Field research supported the fact that many drivers have an excellent approach to interacting with mobility-challenged people. Similarly, many teenagers are polite, well behaved and

kind towards other passengers. However, this was mainly the result of each individual's intrinsically motivated attitudes and personal codes of conduct.

Nevertheless, it is important to recognise that there are genuine systemic problems with the attitudes and behaviours of some passengers and bus drivers. The effects of this negative behaviour tend to extend beyond the specific incidents that occur. When service users, specifically vulnerable members, encounter a bad experience, they will remember this and will have a doubt in their minds about the quality of their experience next time.

This uncertainty can have a very powerful and negative effect. Even if people subsequently have positive experiences, the memory of the previous bad experience can create a sense of doubt. This doubt can make people question whether they want to use the bus again and leave them with some negative feelings for the duration of their travel. Moving forward, the challenge is to find effective ways of improving the ambience on board and tackling some of the psychosocial issues that have been identified.

Mentality shift in addressing accessibility in public transport

Good progress has been made in recent years in terms of addressing the physical accessibility issues. There could be problems getting to and from the bus stop and sometimes there were problems with ramps and small wheelchair spaces. However, it was generally the case that it was physically possible to complete a journey without excessive difficulties.

Perhaps the most striking issue to emerge from the research was the role that psychosocial factors played in affecting mobility-challenged people's quality of experience of using public buses; in particular, the impact of the attitudes and behaviour of the driver and of other passengers. Bad experiences of this nature were the most frequently cited reasons for not enjoying a bus journey or for not using the bus at all.

Previously, the emphasis of accessibility research and improvements schemes was on the physical elements of accessibility. While these are certainly extremely important, the outcomes of this research suggest that psychosocial issues are equally, perhaps even more, important. This observation mirrors those within the field of design generally, where there has been an increased attention in recent decades on psychosocial issues and their emotional consequences (Norman, 2005).

There is need for a 'mentality shift' when addressing accessibility in public transport. This research suggests and highlights 'psychosocial' inclusion as the key area of focus. Addressing psychosocial issues requires a focus on people. It involves making people aware of the effect that their behaviour is having, motivating them to change it and giving them the skills and insights needed to do so. It also involves creating a desirable ambience throughout the bus journey, making the public transport experience not only efficient but also pleasurable.

Enhancing accessibility – an integrated approach

Overall – including both physical and psychosocial factors – the following nine recommendations are proposed as key principles for improving mobility challenged passengers' experience of public bus travel:

- **Create an inviting and friendly experience of the bus service.** Perceptions about bus travel influence people's decisions about whether to take the bus and the emotions associated with anticipating using it. Mobility challenged people should be confident that their bus journey will be a positive experience.
- **Make bus stops reachable.** Getting to and from the bus stop is, generally, the biggest physical barrier to bus travel for mobility challenged people. Making bus stops more reachable would significantly increase the numbers of people who could access public buses.
- **Make all bus stops fully accessible.** Once at the stop, mobility challenged people should be accurately informed about when the bus will arrive. The design of the stop should also facilitate quick and easy ingress for them.
- **Promote and facilitate positive behaviour amongst passengers.** Interactions with other passengers should be positive and friendly throughout the bus journey.
- **Ensure that key aspects of the bus are fully operational.** The aspects of the bus that affect accessibility should be fully operational at all times. Mobility challenged people should be confident that their journey will run smoothly and efficiently.
- **Ensure that all users have a safe and comfortable space.** All mobility challenged users should have a safe and comfortable space in which to complete their journey. They should be able to move into and out of this space easily.
- **Welcome mobility challenged people aboard.** Drivers should warmly welcome mobility challenged people aboard the bus. They should communicate clearly and cheerfully with them throughout the journey.
- **Set off and drive smoothly.** Ensure that mobility challenged people are settled before moving off. Make sure that this is done smoothly and that the drive is smooth and controlled throughout the journey.
- **Provide information clearly through multiple channels throughout the journey.** Mobility challenged people should be clear about when the bus is approaching their stop and have plenty of time to prepare to exit.

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Visual design of bicycle routes to prevent single-bicycle crashes

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Design guidelines recommend edge-markings for motorists but not for cyclists on cycle tracks. Guidelines suggest bollards on cycle tracks to close them off from cars and in Scandinavia rocks are even used for that purpose. This suggests an untested assumption that cyclists, due to their lower speed, can do with a low level of guidance and are always able to detect obstacles in their way.

However, cyclists' visual capabilities vary widely. In fact, for people who do not have a driver's license due to a visual acuity of below 30/60, it can be the only efficient means of independent transport.

Fig. 1 *The IDED analyses shows that thread marking is necessary for safe descending of this stair. The IDED method consists of two steps: 'Image Degrading' (ID) and an 'Edge detection' to calculate and display the visibility of important structures in the periphery of the visual field.*

The design of accessible cycle routes for people with low vision is important from a 'Universal Design' perspective. Moreover an increasing number of cyclists are victims of single-bicycle crashes, i.e. falls and obstacle collisions. The decreased visual capabilities that come along with ageing may contribute to the increase.

To study the role of the characteristics of the visual design in single-bicycle crashes we conducted our study in two steps. In the first step, we performed a survey among single-bicycle crash victims to study crash characteristics related to vision such as light condition and age. A selection of 21 crashes, potentially related to the visual design, were selected for the second step in which we studied the visibility of critical information at crash scenes using the IDED-method (see Den Brinker & Daffertshofer, 2005). The IDED-analyses revealed that the critical information – necessary for safe riding – was often difficult to see in the visual periphery at crash scenes where the victim rode off the road or collided with a bollard or road narrowing (Schepers & den Brinker, 2011). We recommend edge markings for bicycle tracks. Bollards should be removed or, if not possible, be clearly introduced visually.

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Universal design of self-service terminals: attitudes of key stakeholders

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Self-service terminals (SSTs) are becoming very common, yet their accessibility for disabled and older people is very poor. We investigated this issue by interviewing 22 stakeholders in the SST value chain. We present the results of the interviews and recommendations for improving the situation.

Background: the growth of self-service terminals

Increasingly we are being asked to interact with more and more self-service terminals (SSTs). We may get our cash from an automatic banking machine (ATM); buy our bus or train ticket from a self-service ticket dispenser; check in for our airline flight at a self-service check-in machine; and check out our own groceries at a self-service supermarket checkout. There are a number of reasons for this move from human-mediated services to SSTs. Computing systems are becoming increasingly sophisticated in the interactive functionality they can offer for lower costs than employing humans to do the same jobs. Employment costs for staff are usually a major cost for businesses, so although moving to SSTs may involve an initial investment in equipment, their use offers businesses longer-term savings. In addition, many consumers are increasingly expecting services to be available 24 hours a day, 7 days a week, so SSTs may be the only way that a business can provide such a level of service.

In some cases the SSTs may supplement a human delivered service. Therefore, at a train station, there may be an office where you can buy tickets from a human being, in addition to SSTs. However, there is also an increase in the number and frequency of unattended machines and services. This means that there are occasions when there is no other way to get the service except via an SST, and if the machine is not accessible to particular people, then the service is unavailable to them. Further, in some cases, the public has to pay extra to use the human delivered service.

The problem of accessibility of self-service terminals

If you have a disability or are an older person, using SSTs may be difficult or even impossible. Some of the problems might be:

- If you are in a wheelchair, getting close enough to the controls of a SST may be impossible
- If you are partially sighted, the print on the screen or buttons may be too small or not have sufficient contrast for you to read
- If you are an older person, SSTs may time you out because you need longer to make the decisions asked for by the SST.

Why should it be that the SSTs are so often inaccessible to older and disabled users? Why do manufacturers and deployers of SSTs not consider the needs of these segments of the population?

To answer these questions, we first consider who are the key stakeholders in the value chain of producing and deploying SSTs and then present our research on current levels of awareness of different stakeholders in that chain, to help explain the current poor state of accessibility of SSTs. Finally, we consider some of the ways forward to improve SST accessibility.

The complex web of stakeholders in the value chain of accessibility of SSTs

The development of SSTs is a complex technological process involving a number of different kinds of stakeholders. Some manufacturers provide only particular hardware components for SSTs, such as money dispensers or touch

screens. Others provide complete hardware solutions and yet others provide both the hardware and the software. In addition, there are also companies that provide only the software for SSTs. All these stakeholders are *suppliers* of SST technologies in some sense. Finally, there are the companies and organizations that *deploy* SSTs – from airlines to supermarkets, from government departments to museums. The value chain, with possible routes from hardware, through software to deployers, is summarized in Figure 1. So there is a complex network of suppliers and deployers, and this may lead to some of the confusion around accessibility – who is responsible for accessibility and who knows how to achieve it?

Fig. 1

The current levels of awareness about accessibility of self-service terminals

To investigate these questions, we conducted short interviews with a range of stakeholders in the value chain of SSTs. In total, we undertook 22 interviews. Of these, 12 were with industry representatives at the Kiosk London and Kiosk Europe 2011 Exhibitions. The others were undertaken during on-site visits to companies, by phone and email. 20 were with suppliers of SSTs or components (either hardware or software), and two interviews were with deployers of SSTs. One deployer was an educational institution and the other was a public authority.

Looking at the information collected from the interviews, three interesting themes emerged. The first theme concerns the degrees of awareness in organizations about accessibility. The second theme concerns the perception of accessibility as an expensive add-on, while the third theme was that of requests for clear guidelines about how to achieve SST accessibility.

As a note on methodology, it is worthwhile to point out that it would not really have been feasible to collect this data regarding the level of awareness of accessibility issues amongst stakeholders in any other way than at exhibitions such as Kiosk London and Kiosk Europe. It was the only way to sample stakeholders without creating a bias towards those already interested in and probably knowledgeable about accessibility. In other surveys we have conducted (e.g. a survey of web developers about their knowledge and interest in web accessibility, Petrie et al, 2006) we have realized that individuals who respond to a survey about accessibility are more likely to already have an interest in and knowledge about the topic. However, by going from booth to booth at an exhibition asking people what they know about accessibility in relation to their products, one obtains a much more unbiased sample.

The first theme to emerge from these interviews was the high number of stakeholders who were completely unaware of accessibility issues (9 out of 22), and who were unable to see how such issues could apply to them. All of the nine were stakeholders interviewed at Kiosk London or Kiosk Europe. These stakeholders were nearly all component suppliers/software suppliers, who sell their products to other organizations that integrate them into whole SSTs. Therefore, they believe that the issue lies with the integrators.

To be fair, some larger well-established companies are aware of eAccessibility issues and are even leaders in the field of accessibility. At least two of the companies interviewed were well aware of the range of accessibility issues and are actively working on accessibility projects.

A further dimension to the accessibility awareness theme was that some stakeholders,

while showing some awareness of accessibility, do not appear to know much more beyond the basics of physical accessibility and had not thought about issues of access to information in an SST for visually and hearing impaired users.

The second theme is the perceived cost of accessibility. Stakeholders were very uncertain about the additional costs that might be involved in making SSTs accessible, and what the return on investment (ROI) would be. Often stakeholders believed that accessibility features would be very expensive to introduce. Stakeholders also felt that the market for accessible SSTs is negligible and that small companies do not have the resources to deal with this issue.

The third theme was the request for clear guidelines on how to ensure that SSTs are accessible. Two complementary points of view were often raised in the interviews: *"tell us what to do and we will do it"* and *"we know we don't know what to do"*. This reflected both lack of knowledge but also the difficulty of taking user needs and deployers' requirements and turning them into accessible SSTs.

Recommendations for improving accessibility of SSTs

On the basis of our interviews and other research on the accessibility of SSTs, we propose seven recommendations.

1. **Discourse on accessibility must be relevant for industry**
   Tailor discourse to industry concerns, such as the business case for accessibility (including return on investment, compliance with regulations, branding, customer loyalty, new business opportunities). Orient messages to ways of increasing revenue (e.g. by gaining more customers; by being seen to be socially responsible and ethically conscious), and not losing revenue (e.g. with products and services that are unusable by up to 20% of users; and/or do not comply with legislation and standards).
2. **Make contact with well-established suppliers active in accessibility**
   Make contact with those suppliers who are active in the accessibility domain, e.g. those working in ATM and payment machines. Suppliers who have an established history in SSTs are able to support the design and development costs of providing accessible solutions. However, they claim they are not asked by deployers to supply accessibility features. It would be beneficial to understand why this is so, and to explore the different ways suppliers can bring their influence to bear on increasing accessibility to SSTs via standards, assisting and educating deployers, etc.

3. **Develop appropriate Guidance for deployers of SSTs**
   Deployers of SSTs need guidance regarding accessibility. This might include information about:
   - the responsibility they bear to comply with legislation
   - demographics and the numbers of population whom they exclude by not including accessibility features in the SSTs they deploy
   - tendering and procurement processes
   - where and how to situate SSTs in the physical space.
4. **Collect information about SST accessibility problems to be passed on to relevant stakeholders**
   There is currently very little information about the accessibility of SSTs. Stakeholders are often unaware of the problems that users are encountering. Individual users and user organizations need to be encouraged to give feedback to SST deployers. The deployers would then have the information necessary to discuss their requirements with suppliers.
5. **Better efforts within the SST industry value chain**
   Now we have a clearer understanding of the value chain, we can better tailor our outreach, in particular to:
   - integrators: make them aware of their responsibility to deployers. Help them to offer packages inclusive of accessibility options, and to view this as a business opportunity.
   - component suppliers: demonstrate how their products' features could be marketed to show off the significant advantages they offer to end users. These features can be easy to implement, not increase costs nor require substantial redesign, e.g. printing receipts in larger fonts.
6. **Raise the level of awareness from physical accessibility to eAccessibility**
   Problems of physical accessibility are easy to demonstrate and visualise. However, stakeholders have little or no understanding of eAccessibility, i.e. the accessibility of information and interaction. The web accessibility community can offer assistance.
7. **Work to change the perception in the SST industry that accessibility is only the responsibility of deployers**
   There needs to be cooperation between all stakeholders in the value chain of SSTs if accessibility problems are to be solved.

Conclusions

These recommendations were elaborated as part of the work of the eAccess+ network, www.eaccessplus.eu. The project is continuing to create dialogue with the SST industry. Other initiatives are to train future generations of designers including internships with the SST industry. Finally, the network is collecting relevant information and publishing pointers to this on its information HUB for use by all interested in the accessibility of SSTs.

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Mental maps

Mari Takle Stensaker
[Halvorsen & Reine, Norway]

A mental map is a record of how a city is experienced by an individual. Mental maps of individuals **with different ability to experience their surroundings**, living within the same city, were put together and compared. They were grouped into hearing impaired, sight impaired, movement impaired and non-impaired.

In general, the ways of using the city, the impressions and the level of enjoyment of it, were shared within the groups, but were very different amongst the groups. The study of how people with disabilities use the city can first of all be a tool for city planners to identify which

places/routes are preferred by whom and why. It gives insight into how the loss of a sense can affect orientation in specific physical environments and which characteristics are important for the orientation of people with different disabilities. If it were possible for people relying on fewer senses to orientate in public spaces, the spaces would be usable by more people. The study of the mental maps of certain groups of disabled can also provide a tool enabling the service industry to place specific services, shops and meeting places around the parts of the city that are preferred (or usable) by the groups. However, more importantly, using studies of mental maps can increase the independence and life quality of people with disabilities by identifying the easiest routes to orientate and the most enjoyable public places within the city.

Accessible nature

Standards Norway has elaborated a standard for universal design in developed outdoor areas. The work was led by the Delta Centre. The standard states that "ski trails and lighted ski trails cannot be specially adapted to meet the requirements for universal design." But the standard sets requirements to ski trails to be characterized as *accessible*.

This page: Cross-country on sit-ski near the Fongen Cabin with view to the Sjunkhatten National Park, Norway

All photos: Inger Sjøberg [Valnesfjord Helsesportssenter]

QUICKIE

Valnesfjord Helsesportssenter (Valnesfjord Rehabilitation Centre) is a nationwide specialized institution in physical medicine and rehabilitation in Norway. The centre is located in beautiful scenery. The area is the gateway to Sjunkhatten National Park in the northern part of Norway. For many years the centre has been a showroom for the facilitating and inclusion of everyone in outdoor activities. The universal design of buildings and the facilitation of access to the nearby protected area has been one of the strategies.

This page: Outdoor recreation for all!

"In order for a protected area to be characterised as universally designed, it shall be possible to travel through parts of the area and experience the area's natural assets". **§ 8.9 Protected areas, Norwegian Standard NS 11005.E.2011: Universal design in developed outdoor areas – Requirements and recommendations**

This page: Friendly trails that fit into the surrounding countryside at Langhølja.

3

From barriers to sustainability

The GAATES Vision of

Universal Design and Sustainability

Mukhtar Al Shibani [GAATES President, Saudi-Arabia] and
Marnie Peters [GAATES Executive Officer, Canada]

The GAATES Vision of Universal Design is inclusive of everyone, regardless of ability, and encompasses all aspects of daily life. This includes accessibility of; the Built Environment, Information and Communication Technologies (ICTs), Transportation facilities and services, Tourism facilities and services, and all aspects of Emergency and Disaster Planning.

GAATES
GLOBAL ALLIANCE on ACCESSIBLE TECHNOLOGIES & ENVIRONMENTS

See also: www.gaates.org

About GAATES

The Global Alliance on Accessible Technologies and Environments (GAATES) is the leading international organization dedicated to the promotion of accessibility of the built environment and information and communication technologies (ICTs).

Based in Canada as a non-profit, non-governmental organization (NGO), GAATES was incorporated in 2007 by an international consortium dedicated to promoting accessibility worldwide. GAATES has an International presence in 6 regions: the Asia-Pacific, Arab, North America, South America, European and African Regions. GAATES members include technical experts, individuals, organizations of people with disabilities, experts and companies involved in information and communication technologies, architects, experts in emergency planning and life safety, and interested supporters.

The Main Challenges Associated with Sustainable Universal Design

Planning for diversity and the Universal Design of all facilities and services means taking into account the whole range of human functioning; persons with disabilities, seniors and the aged, as well as persons with temporary disabilities such as people who are pregnant, have a broken leg, etc.

For many people, Universal Design equates to accessible buildings for people with mobility impairments. The main challenge in sustainable Universal Design, is mainstreaming the implementation of the principles of Universal Design to all elements of design, rather than relying on 'accessible' design for the development of environments and products to be usable by all members of society without adaptation.

"Universal Design must be present in standards, legislation and regulations for the building industry and industrial design. But regular people are really the ones that can make a real change. ...bring Universal Design to the masses, to make them aware of the potential, the beauty and the usefulness of a well thought out design. The Universal Design philosophy must permeate a country's whole education system, from basic to higher education."

Andres Balcazar, GAATES Communications and Project Coordinator, Mexico. 2012

The challenge of mainstreaming Universal Design is still apparent in design and implementation practices in both developed and developing countries.

In developed countries, there are well-developed codes and standards for a multitude of design elements related to accessibility and accommodation, but an understanding and knowledge about sustainable **Universal Design** practices is still lacking. In developing countries and countries in transition, there are very few codes or standards for the built environments, accessible ICTs, provision of accessible services, etc. and there is little to no knowledge or understanding of the principles of Universal Design and the development of sustainable environments, services and products.

Universal design is design that empowers diverse populations by improving quality of life, human performance, promoting health and wellness and encouraging social participation in the society.

"People would like an approach taken which is that of universal design (and universal access) in developing the right of access to goods, services, and employment, along with other aspects of a right to participation in society. ... language needs to move away from this being seen as a disability issue alone towards an issue affecting a large number of people in any population."

Amanda Gibberd, GAATES Board member, South Africa. 2012

In countries that already have policies and legislation related to accessibility, greater effort is required to reduce the gap between policies, plans and the concrete implementation of the principles of Universal Design.

In developing countries, the development of policies, legislation and standards for accessibility of ICTs, Built Environment, Education, Transportation, Tourism, etc. is key to excluding a whole class of citizens from active participation in all aspects of daily life.

Sustainable Elements of Universal Design

The GAATES mission is to promote the understanding and implementation of accessibility of the sustainable built, social, ICT and virtual environments, using the guiding articles of the UN Convention on the Rights of Persons with Disabilities (CRPD); including architectural, infrastructural design, transportation systems, habitat, and electronic information and communication technologies; so that everyone, including people with disabilities and older persons are able to fully participate and contribute to society.

In the GAATES vision of Universal Design, sustainable Universal Design and Accessibility do not exist in a vacuum, they are interdependent upon a number of themes.

Education is necessary for sharing the vision of universal design; what it means, the benefits to society as a whole and working towards achieving environments or products that are truly usable and accessible to everyone, including persons with a disability. Education applies not just to architects of the built environment, but urban planners, professors at schools of design, and school students of all ages who are learning about the full integration of all members of society.

Development of best practices criteria for the Universal Design of the Built Environment, ICTs, Transportation, Tourism, etc. can be led by countries with a strong basis in accessibility and accommodation.

Developing countries and countries in transition that are in the early stages of codes and standards development to accompany implementation of Article 9 of the CRPD, have a unique opportunity to develop legislation, standards and policy based wholly on the principles of Universal design.

"It's very much a matter of translating Universal Design into accessibility measures in statutory documents, standards and control procedures that are put to use every day in most countries."

Søren Ginnerup, past GAATES Board Member, Denmark. 2012

Sustainable Built Environments exist where codes and standards are those that are based on the principles of Universal Design and take

into account the needs and requirements of all users. They incorporate international best practices, clearly identify mandatory and optional code requirements, and take into consideration local and cultural nuances.

Sustainable Universally Designed Transportation, includes full and accessible access to: terminal facilities; communication of information of travel information before and during a journey; and emergency planning etc. Accessible transportation facilities and services are required regardless of the mode of travel, whether persons are travelling by airplane, trains/subways, buses, taxis or ferry boats but to name a few modes.

Emergency & Disaster Planning according to the GAATES vision of sustainable design, is not exempt from the application of the principles of Universal Design. Persons with disabilities have the same rights to life safety and human rights as all other persons. Disaster and emergency planning can apply Universal Design by ensuring that disaster risk reduction policies, plans and protocols take into consideration the communication and evacuation needs of persons with disabilities, this includes: prior to an emergency, during emergency situations, sheltering & relocation and during reconstruction and resettlement.

Sustainable virtual environments are developed through the use and application of accessible ICT and Adaptive Technologies in education, vocational training and employment. It is a solution that can remove barriers to the full inclusion of persons with disabilities in all aspects of daily life. ICTs can be a powerful tool in supporting education, employment and inclusion for persons with disabilities.

Working In a Global Perspective

GAATES is working and partnering with other leading international organizations to ensure implementation of the articles of the UN Convention on the Rights of Persons with Disabilities (CRPD). Without the full implementation of the requirements of Article 9 – Accessibility, it will not be possible to reach the full implementation of nearly every other Article of the CRPD.

GAATES has also been recognized by other organizations as the International leader in accessibility and has successfully undertaken a number of projects for the United Nations Educational, Scientific and Cultural Organization (UNESCO), The Economic and Social Commission for Asia and the Pacific (UNESCAP), the UN Department of Economic and Social Affairs (UN DESA) and various Government Agencies and States Parties. GAATES has worked collaboratively with The United Nations Children's Fund (UNICEF), the International Telecommunication Union (ITU), The Global Initiative for Inclusive ICTs (G3ict), the World Wide Web Consortium (W3C), the International Standards Organization (ISO), the World Summit on the Information Society (WSIS), and a plethora of

"Universal design is design that empowers diverse populations by improving quality of life, human performance, promoting health and wellness and encouraging social participation in the society."

Aqeel Qureshi, GAATES 2nd Vice President, Japan/India. 2012

other international organizations. GAATES has established a strong collaborative structure of international experts and strong leaders and has collaborative working agreements with other leading National and International organizations.

Working in a Range of Countries with Varying Economic Situations

GAATES has members from around the world, in both the developed and developing countries. There are many capable people with disabilities around the world, and GAATES relies on the knowledge of international experts and people on the ground in their homeland.

"Countries need a national strategy to promote Universal Design; the strategy includes;

1. **auditing current projects**
2. **review projects at planning**
3. **Awareness**
4. **Training for professionals (i.e. architects, engineers, industrial designers, etc.)**
5. **Integrate Universal Design into all education streams (i.e. architectural and built environment education, ICT developers, industrial designers, etc.)**
6. **Introduce accessibility consulting as one of the planning and design stages."**

Ahmed El-Rida, GAATES Board Member, Libya. 2012

In support of the GAATES mission to support the implementation of the CRPD and the global adoption of the principles of Universal Design, GAATES is working with "Country Representatives" around the world. This enables our organization to tailor the development of Universal Design policies, practices, codes and standards in each country to a CRPD implementation plan that fully accounts for local nuances, as well as the ability of States Parties to absorb any associated financial burden associated with implementation.

Some may believe that CRPD implementation and the adoption of sustainable Universal Design is more difficult in developing countries. **In truth, sustainable Universal Design and implementation of the CRPD is most easily attained in countries where there is a respect for persons with disabilities and the contributions that they make to their community and society as a whole.**

The GAATES Vision of Sustainable and Inclusive Universal Design is:

a society of environments and products, that are designed for and usable by everyone, without need for adaption or accommodation; and of attitudes and policies that encourage the full integration of persons of all abilities.

Challenges and opportunities

Professor Satoshi Kose
[University of Art and Culture, Hamamatsu, Japan]

Natural disasters like earthquakes and tsunamis pose big challenges both for temporary housing and the planning of residential areas in Japan. They, together with a rapidly aging population, have created the need for more universally designed dwellings.

In 2055, around 40% of the Japanese population will be 65 and over.

Problem of housing for seniors

In the past, the extended family was assumed to be the norm. When a larger land plot was available, a special room for respectable seniors or a Granny Annex was provided. With the nuclear family becoming the majority in cities, and their land plot being too small to arrange an additional room or an annex, a different strategy had to be sought. Since the houses they originally built were full of barriers and inconvenient, difficult-to-use design features, special rental dwelling units for seniors (similar to UK sheltered housing) were sought, particularly for those seniors who lived in the private rental sector. (Seniors tended to be refused as renters because of the lack of financial security – rents not being paid, higher risk of fires, etc.)

Rapid Aging in Japan

An alternative idea was to universally design dwelling units, in which people can live until they pass away (design for the ageing/aged society), i.e., from cradle to grave. The move in this direction was revealed to be inevitable in 1986 when a revised population forecast suggested that in 2030, a quarter of Japanese would be 65 and over. The ratio of 65 and over increased every five years after that estimate, and the most recent forecast suggests that the 25% level will be reached in 2013, and in 2055, around 40% will be 65 and over.

Toward universal design of dwellings

During the Research and Development Project for the Ageing Society that lasted from 1987 to 1991, the Building Research Institute, Ministry of Construction, tried to formulate design guidelines for dwellings for the ageing society, and submitted them in 1991 & 1992 as drafts for multifamily housing and detached houses, respectively.

The housing design guidelines recommended three basic ideas:

1) No level differences inside the unit;
2) Handrail installation at several places; and
3) Wider corridor and doors.

Requirements by HLC in 1996

However, it took a few years before the design guidelines were officially issued in 1995 (and the ideas were ignored for temporary housing after the Great Hanshin Earthquake – many seniors and people with disabilities suffered from inaccessible design in temporary housing and retrofitting to them had to be done). The idea of universal design dwellings acquired momentum in 1996 with the Housing Loan Corporation (HLC) of Japan adopting the basic concepts for their preferential mortgage schemes: design for aging, energy conscious design, or high durability design became necessary conditions for preferential interest rates and larger mortgages. Complying with

design for aging gained popularity, and more than 50% of HLC clients utilized the preferential mortgage scheme in 1999.

How easy were the requirements? It was much easier to comply with for new construction. It was however difficult to modify existing dwellings, which is exactly where seniors (who are becoming frailer) live as owners or as renters. The government's expectation was that older, below-standard dwellings would be demolished and replaced with new ones. Unfortunately, older ones survived and new construction was done on new sites. The reason for the survival of older dwellings was their cheap rent.

Further policy move

There was another government initiative: Housing Performance Indication System was introduced in 2000, based on Housing Quality Assurance Law (which is similar to Product Liability (PL) Law in its concept). Still another attempt was the introduction of Securing Housing for Seniors Law in 2001. It was aimed at persuading the private rental sector to become a key player in the provision of senior friendly dwelling units. It adopted the design for ageing society guidelines as a tool to implement policy.

Long-term care insurance for the aged started in 2000, to take care of frail seniors. It however, lacked proper recognition of the importance that a good dwelling makes towards successful aging. Most of the funds go to human resources, which are just wasted, without building up a sound base of good dwellings. (Home modifications are only marginal in the scheme, with only 200,000 Yen, i.e., roughly 2,000 USD or 1,600 Euros, the maximum available to seniors at one time for remodelling.)

Revision of Securing Housing for Seniors Law in 2011

The original intention of the law was to boost rental housing targeted at seniors. Potential problems of having seniors as renters are: risk of fire; rents not paid; and if renter passes away (with no family or relatives to take care of matters afterwards). A system to lessen the problems was introduced, but the number of dwelling units did not increase as expected. Therefore, a revision introduced new ideas: the target is to increase service flats for seniors, i.e. combining accommodation with services founded by the long-term care insurance system, in particular, with regular visits. Banks are persuading landowners to build new rental accommodation as a good way of investment in this sluggish economy.

Compared to other countries, Japan has a reasonable number of institutions for seniors, but not dwellings.

Universal basic requirements: Are they enough?

As stated earlier, the following three requirements must be universally attained for anyone to live with a sense of safety and security: floor without unnecessary level difference; support for handrail installation; and width of crucial space dimensions. These requirements are not sufficient if residents become frailer. How can we include everyone to age in-place? Do we need a higher level of design standards? Is there a problem of cost in universal preparation? Perhaps we need to introduce assistive technologies and special made-to-order design adaptation. They are however feasible only if the above basic requirements are met.

Disaster preparedness?

Another difficulty we face is disaster preparedness. The Great-Hanshin Earthquake in 1995 revealed a lack of recognition of the needs of frail seniors and people with disabilities. **Emergency shelter was completely non-universal, completely inaccessible.** The temporary housing was not accessible either, without flat access (no ability to visit). After these problems were revealed, extra effort was made to carry out remedial work on them one by one. Public rental housing constructed to accommodate those

who had lost their dwellings (and chose not to build their own) adopted a non-step bathroom, which soon became the norm in private sector housing as well (mainly for purchase, but not for speculative rental since their target renters were the younger generation). However, the possibility of merging toilet and bathroom areas in case of need was not considered even in the dwelling units for purchase by families. Developers still provide dwelling units with toilet and bathroom on opposite sides of a central corridor.

With the experiences after the earthquake, attempts have been made to make life easier for everyone. One initiative, the Japanese Association for an Inclusive Society, was established in 1997 with the aim of combining the strengths of different disciplines towards better preparedness for people with disabilities and seniors, both during everyday life and emergencies. However, members were aware that more has to be done, as improvements have been slow to be implemented.

The East Japan Earthquake in 2011 and Tsunami

The most recent disaster revealed further problems that have to be faced. As before, the emergency shelters were inaccessible. Regarding temporary housing, some improvement in accessibility was made, but not enough. Many had to struggle to make dwelling units accessible and usable, referring to lessons learnt in 1995. The idea of from cradle to grave is not yet understood by those who ordered the temporary housing to be built. The emphasis was cost and speed.

Account has to be taken of additional difficulties in the provision of permanent housing. Earthquake resistance is not enough. The argument is whether one can reconstruct in the Tsunami devastated area. No one can tell when the next big Tsunami will come: in 50 years, or in 1,000 years.

Conclusion

Universal design is not an ultimate goal. Rather it should be a starting point from which additions and revisions can be made. Only with this notion, design of the built environment, and dwellings in particular, could become better places for living and experiencing.

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How can we ensure space for universal design in early sketching?

Søren Ginnerup
[Danish Building Research Institute, Denmark]

One single shift in decision on the fundamental shape of the building can increase the total cost far beyond original expectations, eventually forcing the organization to look for savings in space. How do we avoid universally designed stairs, lifts, toilets and corridors becoming candidates here?

With universal design on the agenda it has become increasingly important that procurers, architects and consultants are fully aware of how incredibly decisive the earliest specifications and basic sketches on the basic shape of a building may be. Spatial efficiency, the end price tag, and core universal design features rely on this. Once the conceptual shape has been selected, surprisingly little can be changed about these factors at the later stages. Being a consequence of simple mathematics of buildings, daylight factors, thermal comfort and zero energy goals, these relations often come as a surprise to the people involved.

This article exemplifies the interplay of a handful of the aspects, aiming at more qualified early discussions among the professionals and non-professionals involved. The hope is to ensure adequate room spatially and financially for space dependent universal design features.

The initial description or sketch may decide it all

A decision on a tall landmark with many stories, really energy efficient, with a great gross to net ratio, and of course featuring universal design more often than not is a self-contradiction. Compared to a building with few stories, only the willingness to accept a heavily increased price tag or much less usable space may compensate for more stories.

Mathematics on multi-storey buildings together with regulations dictate that core space for lifts, stairs, toilets and ducts is almost proportional to the number of floors, as a larger and larger proportion of all persons have to be transported vertically for each additional floor. Lift, stair and evacuation capacities have to go up. Universal design considerations often mean wider corridors, wider and longer stairs, larger toilets and lifts. All of these tend to repeat themselves on each floor.

Fig. 1 *Example on how core space (in red) increases more than proportionately with more stories. Go for a limited number of stories if spatial efficiency is to be kept high, freeing up more space for universal design of e.g. stairs, corridors, lifts, toilets, as well as informal meeting and social places.*

The example in figure 1 shows how you have to enlarge the tall building substantially in order to obtain the same usable space as in the low building.

This may be common knowledge among some procurers and consultants, but not much so in the author's experience. Mathematics of the shapes of buildings are rarely on the agenda of early decision makers. And, as an architect in a competition you don't necessarily want to question ambiguous specifications, when all you want at this stage is simply to win.

Strategies:

- Procuring organization: raise a basic awareness of the importance of the shape of a building to the final price tag. Otherwise there may not be adequate room for universal design features.
- Architect: if specifications on building shape and landmark value are unclear then try to open a dialogue with the procurer and visualize essential relations between usable area, the shape of a building and the final price tag.

Energy saving building shapes and wayfinding

For wayfinding purposes and spatial efficiency, strive for the blade-shaped, narrow buildings that represent the latest tendency in zero-energy efforts. They open for optimal use of daylight in all rooms, increased thermal comfort, use of natural ventilation and fewer corridors to have to choose from. Bulkier shapes promote more corridors, meaning more routes to choose from. This most likely increases the average interconnection density (ICD) figure of a building. Blade shaped layouts with one corridor serving most rooms on a story can be designed to ICDs below two, bulkier layouts may easily display ICDs above 3. This is a very significant difference (O'Neill: 1991).

Fig. 2 *A narrow shape on the left allows for less space spent on corridors.*

Bearing in mind that signage only to a limited degree can compensate for inferior wayfinding characteristics; the shape defined by the early sketch again comes out as extremely important. Legibility, articulation, grouping etc. can be equally defining, but the influence of the underlying corridor pattern remains part of the picture.

Strategies:

- Consider the possible synergy of narrow, highly energy efficient buildings and simpler corridor layouts
- When possible avoid bulkier shapes that generate more corridors, reduce net space and complicate wayfinding
- Keep the ICD number of options per decision point low

Procurer and architect: beware of ghosting of corridors

Ghosting of corridors is a common way of compensating for low spatial efficiency in building layouts. Basically it just means removal of walls between, for example, offices and corridors, sometimes even relabeling all of it as office area. While probably adding to the perceived open space and inherent flexibility of a room, a procurer should be aware that this ghosting of corridors may in fact conceal that the usable area is reduced. The architect may be indirectly forced to resort to this ghosting of corridor space due to a spatially inefficient building shape.

Fig. 3 *Less bulky shapes may render fewer corridors, lower ICD and less complicated wayfinding.*

Building information modelling systems (BIM) offering automated checking of spatial efficiency are often fooled by ghosting of corridors as in-room spatial labelling often requires manual handling.

Strategy:

- Procurer and consultants involved in the early procurement specification should discuss possible implications of shape design on economic, spatial efficiency, energy consumption and universal design features
- Label corridor space as gross and not net space, even when being part of open rooms

Existing buildings: combine several strategies

Several Danish large scale projects demonstrate that improvements in architectural quality of, for example, dwellings and their vicinity can be combined with more universal design features, provided that the procurer assigns it a high priority. Strategies that include merging of apartments allow for the introduction of lifts, larger bathrooms, more circulation space, wider doors and accessible balconies. All of this may blend in well with the main attractions to new tenants who appreciate larger living rooms, more luxurious bathrooms, step-free access, larger kitchens and step-free outdoor routes.

Strategy:

- A combination of improved architectural quality, combined with the merging of smaller units into larger ones opens towards layouts featuring improved accessibility
- Existing buildings: focus on core functionality in refurbishments

Regulations today may be quite strong, making it challenging to meet requirement in alterations, unless when specified in detail as in the Americans with Disabilities Act Guidelines in the USA. A study of the alternative designs offered in international and national standards show that these can be a route towards more universal design features in existing buildings. When not having the option of rearranging units radically, some of the international standards communicate sets of viable solutions that can be employed when space is missing.

Compared to several European national regulations international standards sometimes offer useful solutions worth considering to, for example, the design of ramps, stairs, toilets, corridors, passing spaces, tactile walking surfaces, train and station design. In planning the refurbishment of an existing building it is normally impracticable to widen existing, narrow corridors to more universal widths, but an introduction of adequate passing spaces at strategic points may prove realistic, almost rendering the same functionality.

This principle of closer focus on core functionality can be applied to most of the instances where compromises have to be made, be it when differences in level are high, available space for accessible toilets too small, stair landings too small to allow proper design of handrails, or available area for tactile markings too small. Inspiration is available in many neighbouring country standards, as well as in major ISO, CEN, ADA, BS and DIN standards.

Strategies:

- Focus on core functionality of problematic issues
- For alternatives to national regulatory solutions refer to international standards on accessibility and universal design

Beware of national legal systems

Even when differences in regulations in countries are taken into consideration, the first examples in this article maintain their value when looking at universal design that goes beyond basic regulatory requirements. The mathematics of shapes of buildings coupled with strong sustainability efforts stay comparable.

When working on universal design across borders, however, pay attention to the fact that legal systems do not open up equally well to alternatives to national standardized solutions. Local expertise is often required to comply with standards and take projects through control systems. Consultation on alternatives may range from sporadic to full inspection. This applies to existing as well as new buildings.

Strategy:

- Partner with local expertise when working on cross-border projects on universal design and accessibility
- Be aware of and identify differences in legal systems, control procedures and standards

Ref. O'Neill, Michael (1991): **Evaluation of a Conceptual Model of Architectural Legibility**. Environment and Behavior 1991 23:259

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And so on – UD2012 and further

A reflective perspective

Dr Evastina Bjørk
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Design for enabling social participation

Since 1948, the United Nations has led the development of a series of Conventions on Human Rights. Many of the conventions specially include statements that prohibit social discrimination in political life, public life, healthcare, housing and other activities that are essential for social participation. The main goal of the convention on the Rights for People with Disabilities (2006) was to achieve full and equal human rights including the provision of access to public accommodations, transportation, housing and ICT.

All areas stated in the convention were among the main topics at the UD 2012 and many interesting presentations provided examples of both successful and less successful projects.

Two themes frequently discussed at the conference were *participation and empowerment*. Most presentations focused on the aim of UD´s goal to create a society accessible to as many as possible. While several contributions considered additional values like usability, beauty and safety. *The lifespan perspective was highlighted by some authors, which is indeed relevant, particularly from a demographic point of view.*

Diversity was a term present in several of the presentations and discussions at UD2012. The fact that diversity comprises acceptance and respect was concluded and reflected on by one of the key-note speakers Associate Professor Inger Marie (Lid 2012). Diversity means to understand and acknowledge that each individual is unique. Full and effective participation and inclusion in society requires respect for differences and acceptance of persons with disabilities as part of human diversity and humanity (CRPD 2006).

Sustainable solutions was another theme recognized. *"Designing for sustainability is not only re-design of our habits, life styles and practices but also the way we think about design"* was argued by professor Steinfeld from Buffalo State University in the US, one of the key-note speakers at the conference. Sustainability as a process of co-evolution and co-design that involves diverse communities in making flexible, adaptable design decisions on a local, regional and global scale was addressed.

Governmental responsibility was a topic in focus at the session for "UD perspective in community planning", and Einar Lund from the Norwegian Ministry of the Environment presented the new Plan and Building Act in Norway (2008). Together with a number of other speakers he argued for the importance of governments taking responsibility for and stimulating the development of Universal Design policies and strategies.

The importance of *cross sectorial and interdisciplinary work* was exemplified in a number of projects that well illustrated the value of mixing people from different professions and areas for finding new and innovative UD solutions. The presentation by Associate Professor Karin Høyland from the Norwegian University of Science and Technology, NTNU, demonstrated how students from different University´s different institutions were mixed while doing project group work and how that stimulated innovative solutions, rather unexpectedly.

Universal design – a future health issue for all generations

Health and wellness are global areas where there is a growing understanding that UD has significant impacts. However, limited research exists to guide professionals who strive to practice Universal Design with the goal of improving health and wellness.

Environments, products and systems deserve careful attention when health activities

“UD includes all people, without exceptions, it is based on democracy and the Universal Declaration of Human Rights.”

are planned for or when new initiatives concerning health issues are discussed in order to inhibit the development of new "barriers". Good examples of health issues related to environmental design are the environmental factors in falls, especially among elderly. Poor design and maintenance are causes of pain and suffering for the individual who has an accident and generate an economic burden for society. Accidents are the fourth leading cause of death in the western world (after heart disease, stroke and cancer) and can be reduced if knowledge is added to the design of environments, products and systems. In less developed countries UD can, for example, be applied to water and sanitarian projects to ensure access and affordability to as many as possible.

The main facts that make the Universal Design concept a public health issue are:

- UD includes all people, without exceptions, it is based on democracy and the Universal Declaration of Human Rights.
- The motive behind the concept is inclusion and increased health for all. It is a cross-sector approach where co-operation between professions and disciplines is needed and where civil, public and private sectors work cooperatively.
- It is not a field limited to a specialty or some specific profession to provide solutions for separate or prioritized groups in society (Björk 2009).

At the World Economic Forum in Davos in February 2013 economists expressed their worry for the evolution and argued that, *"healthcare must become more preventive, more affordable, and more personalized. Economically ageing populations imply smaller proportional labor forces, a potentially higher burden on health services, and a different demand profile for products and services. Politically, the power balance will shift towards older citizens* (www.weforum.org). With this in mind, seeking design solutions to health issues is not only a socially responsible goal but also a financial necessity.

UD evolution – some remarks for the future

Universal Design is a new-old concept, rooted in the Disability Movement but applicable to the majority of the world's societies, to the needs of everyone, regardless of age, size, portability or disability.

Integration in mainstream thinking

Research in UD must discover how universal design can evolve and become more central to design thinking in the mainstream, like what has happened with, for example, sustainable design. One can easily measure the benefits of a sustainable design but we lack the tools to do the same thing with universal design (Steinfeld 2012). The cost of not practicing universal design is therefore not so easy to perceive and the political landscape often has too short a time perspective to be able to investigate the benefits of UD in the long run.

Design for flexibility

Designing with flexibility in mind means that design accommodates a wide range of individual

preferences and abilities. The choice of methods to use, facilitation of the user's accuracy and precision and the provision of the adapter's availability to the user's individual pace are important steps to take when adopting a user or person-centered approach to design. This requires an awareness and appreciation of the diverse abilities of people. **UD has mistakenly been described as the search for a one-size-fits-all design.**

Education and training

In Norway and many other countries, to make it possible for everyone to be an active part of the society it is becoming a legal requirement that all information should be accessible for all citizens irrespective of age, health and ethnicity etc. This poses great challenges and requirements for competent professionals and society's ICT infrastructure and services. Education and training plays a key role in building competences within UD in all areas of society and must become a central issue at local, regional and national levels.

Challenges for UD 2014 in Lund, Sweden

How to increase the understanding of the Universal Design's benefits among the general population and politicians was stressed in several presentations at UD 2012 and is one of the most challenging tasks for a sustainable future. The mindset behind UD needs to be changed. The fact that everybody is of the same opinion at a macro level, meaning a society for all, but the priorities suddenly change at a micro level where things actually should be done. A UD strategy implies comprehensive changes in priorities in a number of areas such as economy, organization and planning. The relation or conflict between regulations and legislation on the one hand and the necessity of creativity and innovation on the other is a true balancing act.

To think new thoughts encourages creativity that is of fundamental importance in order to be successful in developing new solutions. The understanding of arguments for UD demands an extensive media discussion and public debates on UD´s benefits for the whole society. Continuous information efforts, publicly conducted research, concrete cases and discussions on UD are crucial. The diffusion process Rogers (2004) deals with considerations and what determines if a new concept becomes adopted or not:

- Relative advantages: to discover and argue for the advantages of UD is necessary to achieve success.
- Compatibility: it is easier to get acceptance and a positive response if the UD concept is compatible with existing regulations, environment or context.
- Complexity: the less complex UD solutions, the more positive response from receivers.
- Trialability: the UD concept must be available for testing, user intervention is of upmost importance for reliability and as references.
- Observability: the benefits of the UD concept must be visible and/or touchable/understandable.

Research on innovation demonstrates that the media is the most effective method to increase awareness of an innovation, but existing social networks are more effective for persuading people to adopt them.

So, we look forward to an inspiring Universal Design Conference in Lund, Sweden in 2014 with a lot of social networking at all levels and amongst all participants.

“UD has mistakenly been described as the search for a one-size-fits-all design.”

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Balancing the scale

Interview with Marianne Wahlstrøm
[Project manager, UD2012Oslo]

Five Norwegian government departments joined forces for the largest conference on universal design held in Europe. The goal of the conference Universal Design 2012 Oslo was not only to be a conference on universal design, but the actual event itself should also be universally designed. Feedback from participants was overwhelmingly positive in regards to both content and execution of the conference.

> Everything may not be available to everyone at all times and every occasion. Diversity is huge. Where do we draw the line between the political vision and what is practical and economically feasible?

One definition of universal design is *"the design of products and environments in such a way that they can be used by all people, to the greatest extent possible, without the need for adaptation or specialized design."* What exactly does "the greatest extent" mean? The definition implies that universal design has a limit somewhere. Everything may not be available to everyone at all times and every occasion. Diversity is huge. Where do we draw the line between the political vision and what is practical and economically feasible?

What considerations and experiences were included in the process? There are no standards or regulations that define a universally designed conference.

Marianne Wahlstrøm answers the following questions. She was project manager for the conference and had to make many choices during its planning and implementation.

What was the most difficult balancing act?

"Simply to find a venue that could satisfy the different requirements we had within our economic limits. If you have unlimited funds you can rebuild, but this was not possible. We created an *Accessibility Statement* which described what we would offer. We chose the conference venue from a wide range of criteria such as the number of HC-rooms, wayfinding both inside and outside, proximity between hotel and conference venue, toilet facilities, access, parking, food and transportation. Before the conference, we sent all participants information regarding our level of accessibility, and this information was also published on the website. The feedback we got was still mostly positive. If it is clear what the situation is at the site of the event, it is nice to communicate all this in advance so that people know what to expect", she explains.

How was it to operationalize and concretize the vision of a universally designed conference?

"A challenge was the many different special interests, which are partly contradictory. Interest organizations were, of course, fighting for their groups with their interests. The challenge comes when there are conflicting interests within roughly the same group and between groups. A guide dog is not particularly allergy friendly. The hearing impaired want rugs on the floors to reduce noise while people with asthma and allergy symptoms shun this", she explains, and stresses that it is important to see the big picture and not just the special interests.

Universal Design vs. individual facilitation

"When enforcing accessibility and universal design you have to take into account both the needs of the many and the few at the same time."

An interesting discussion about sign language interpreters is whether this can be considered as universal design or as an individual facilitation", says Marianne Wahlstrøm.

As an example Wahlstrøm mentions food allergy. "All food was to be clearly labelled with its contents. This was a big challenge for a kitchen that previously had some experience with allergies, but not on such a large scale", she says.

"Another discussed choice was sign language interpreters. What type should we choose – Norwegian, English or international sign language? It is not possible to give everything to everyone. We chose to interpret the international sign language as this was an international conference, and we offered this in all the plenary and parallel sessions at all times. There were four to five lecture series in parallel sessions. Those who used sign language interpreters had to follow the session that was interpreted into sign language – deaf Norwegians could apply to the authorities about a Norwegian sign language interpreter. However, all sessions had writing interpreters, i.e. continuous subtitles on the big screen of everything that was said in all the lectures, discussions and dinner speeches. An interesting discussion about sign language interpreters is whether this can be considered as universal design or as an individual facilitation", she says and continues:

"Writing Interpreters benefit a lot of people, but sign language facilitates only a few. Extending captions of what is being said will help everyone to better understand what is actually being said. Yet, deaf people often find it tiring to read what is said, and perceive content poorer with writing interpretation. If everyone was to get everything they wanted, it would quickly become too expensive. The expense incurred for sign language interpreters and writing interpreters during the conference was 400 000 Norwegian kroner" (about 50.500 Euro).

Culture vs. nature

The conference had participants from 44 different nations with different cultures, religion and values. Is culture an aspect of universal design? Should this be taken into account for example with different worldviews? Is there a difference between a milk allergy and a Muslim who does not eat pork?

"We spent a lot of time considering how to handle food; we collaborated with the Asthma and Allergy Association and the Health Directorate and looked at what was done abroad. We also assessed the religious theme, but it is not possible to have 70 different categories of food, so something had to be merged. There are two different types of milk allergy, so rather than distinguish between them, we cut milk from the menu completely. The main thing is to get something good to eat but the food must be labelled, so you can opt out of what you can not have. It is impossible to satisfy all wishes."

"We would *inspire, challenge and empower* the conference attendees, and some perhaps felt challenged in various ways. Culturally we

The expense incurred for sign language interpreters and writing interpreters during the conference was 400 000 Norwegian kroner (about 50.500 Euro).

probably challenged some people. An interesting phenomenon observed during the conference is that Norwegians in particular, have high expectations of "universal design." While international guests were delighted to get from A to B, the Norwegians thought that everything should be available to everyone under all circumstances, she explains. While international participants found it fantastic that the ferry was wheelchair accessible for boarding, toilets and dining, some of the Norwegians complained that they did not have access to the upper deck.

The Norwegian government has a plan that the country should fully comply with universal design by 2025. Based on your experience with arranging a universally designed international conference – is it a long way from reaching this goal?

"Yes, absolutely", Wahlstrøm says emphatically. "Universal design is not in the minds of people in general, she says, except those who work specifically within this area. Although an increasing number have heard of universal design, there is still a long way to go before everyone who provides goods and services has this integrated in their work. Even fewer have an overall perspective. We began the process with all the vendors we had in the project and thus our contribution to the practice field was taken a step further in any case. This isn't an ideal world, and we must make the best use of the framework we have. One of the main lessons we learned was that informing the guests about the level of accessibility is the most important thing you can do. This shows everything you have thought of, and how you have tried to facilitate everyone's needs, even if you can not satisfy all of the different needs", she concludes.

UD2014 Lund

UD2012Oslo marked an important moment in the European growth of Universal Design.

Not only because it was a large conference but more importantly for the many interesting contributions made by the speakers. UD is a call for creativity and that is exactly what we are hoping for at the next conference, UD2014. It is a privilege to have the opportunity to build on all the great activities started at UD2012Oslo. We are looking forward to welcoming you to "Three Days of Creativity and Diversity" in Lund, 16-18 June 2014.

We are working on making it a solid design conference, with the stress on design. The conference will take place at the campus of Lund University's Faculty of Engineering. It is an important gesture on our part to invite you "home to us" instead of placing the conference at a large conference venue on the outskirts of where things are happening.

Lund University is located in southern Sweden, in one of Northern Europe's most dynamic regions: the Danish–Swedish Öresund region. The event will bring together a diverse group of practitioners and researchers in a broad conference that focuses on collectively exploring creative and desirable solution proposals that will shape the future of UD products and practices.

Our aim is to make UD2014 in Lund a creative and diverse meeting place for both speakers and participants. By exchanging knowledge, experiences and ideas, we can build global connections and creative networks for future work on universal design. The conference will also strive to give participants and contributors a chance to exchange practical experiences through an extensive demo/exhibition track. UD2014 is thematically inclusive to allow for conversations on how to improve inclusion in all areas of societal life, in work and play, in indoor and outdoor spaces, in cities and rural settings, for young and old.

- **UD 2014 will take place between June 16 and June 18, 2014.**
- **Venue: Campus LTH at Lund University, Sweden.**
- **More information: http://ud2014.se/**

Welcome to Lund and Lund University!
On behalf of the organizing committees,

Per-Olof Hedvall,
Conference Chair

“Our aim is to make UD2014 in Lund a creative and diverse meeting place for both speakers and participants.”

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A Nordic Charter

Enhance Society through Universal Design

The Charter

This charter is the result of a collaborative effort among a group of Nordic professionals with experience and expertise from working theoretically and practically in the field of Universal Design (UD) in all five Nordic countries. It is an initiative to be seen as part of a Nordic strategy to implement and gain a greater awareness and knowledge about Universal Design in society.

The Charter will be presented at the conference "UD 2012 – Inspire, Challenge and Empower" held in Oslo, June 11-13, 2012.

People are diverse and everybody has the same rights to access and participation in society. All people regardless of ability should have equal opportunities to take part in society. This should be taken into account by private and public entities which provide goods and services to the public.

Universal Design is an important strategy for all kind of organisations striving to operate in a socially responsible manner.

The Convention on the Rights of Persons with Disabilities (CRPD 2006)* combines a human rights perspective and a perspective for sustainable development. This charter therefore refers to the convention in the rationales below.

The Convention defines Universal Design as "the design of products, environments, programs and services to be usable by all people to the greatest extent possible" (CPRD 2006).

The Nordic welfare states are based on a shared political goal to encourage strong social cohesion. In an increasingly globalised world, both the Nordic region and the EU face more or less the same challenges; empowerment of the elderly, increased employment, longer participation in work life, quality on welfare services, and inclusion of neglected and structurally discriminated groups.

The purpose of this Charter is to present rationales for a successful investment in Universal Design

The rationales

- To achieve participation and empower ment for all through Universal Design
- To raise the importance of diversity in society through Universal Design
- To ensure sustainable solutions through Universal Design
- To secure that Government take responsibility and stimulate the development of Universal Design policies and strategies
- To encourage cross-sectorial and interdisciplinary work to ensure the most environmentally and economically sustainable Universal Design solutions
- To innovate through Universal Design
- To increase understanding of the benefits of Universal Design within the population

Explanations to the rationales

- To achieve participation and empowerment for all through Universal Design

* Reference: Convention on the Rights of Persons with Disabilities. Geneva, United Nations, 2006

The goal for investing in UD is to give all persons the possibility to live in a society providing equal choice, full inclusion and participation. The political, social, educational, spiritual, gender and economic strength of individuals increases in a society that invites to participation.

In countries with life expectancies over 70 years, each individual on average spend about eight years with a disability of some kind. The Nordic welfare model promotes Universal Design principles to create usable solutions for everybody and to overcome challenges for elderly and people with disabilities. Solutions where Universal Design is mind-setting should therefore be the first choice.

Article 3 of the Convention on the Rights of Persons with Disabilities states "Respect for inherent dignity, individual autonomy including the freedom to make one's own choices, and independence of persons" (CRPD 2006).

- **To value human diversity in society**

Diversity comprises acceptance and respect. It means understanding and acknowledging that each individual is unique, and that this is beneficial for the development of humanity.

Universal Design recognises, values, respects and tries to accommodate the broadest possible spectrum of human ability.

Article 3 of the Convention further states that the following principles should permeate implementation of the convention: "Non-discrimination; Full and effective participation and inclusion in society; Respect for difference and acceptance of persons with disabilities as part of human diversity and humanity; Equality of opportunity; Accessibility; Equality between men and women; Respect for the evolving capacities of children with disabilities and respect for the right of children with disabilities to preserve their identities" (CRPD 2006).

- **To ensure sustainable solutions through Universal Design**

Basic needs have to be fulfilled in order for individuals to reach their full potential for self-development and contribution to society. A society should have the socio-economic capacity to support the development of its members, as well as to support the development of resources that foster interaction and contribution to society.

Sustainable solutions in a Universal Design context must consider economic, social, ethical and ecological aspects. The objective of social responsibility is to contribute to sustainable development. The International Organization for Standardization's recently adopted Guidance on Social Responsibility (ISO 26000:2010), which refers to Universal Design and the importance for socially responsible organisations to respect human rights as they are stated in CRPD (2006).

The Nordic countries as well as many regions within the EU face a demographic challenge. The need for health care services to elderly people is increasing at the same time as the available workforce is decreasing. Reorganization of health care services and development of new technology are among other initiatives a way to ensure a sustainable development. The effort should also be focused on developing UD solutions with built-in adaptability and compatibility, to facilitate for as many people as possible.

The preamble of the Convention says: *"Emphasizing the importance of mainstreaming disability issues as an integral part of relevant strategies of sustainable development (CRPD 2006).*

- **To secure that governments take responsibility and stimulate the development of Universal Design policies and strategies**

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Governments should promote full realization of human rights and fundamental freedoms for all without discrimination of any kind. Governments should also recognize the responsibility to undertake and support the implementation of UD solutions, to evaluate and follow-up.

Involvement, education, training of actors, and cross sectorial cooperation are crucial elements of this process. Governmental effort with stimulation programs and action plans on the one hand, and laws and restrictions on the other hand, is necessary for broad societal efforts on UD. The holistic approach towards UD solutions together with a user- centred design philosophy supports the development of good processes. Research should focus on methods but even more important is the support of a "UD mindset".

Article 4 of the Convention obliges to "undertake or promote research and development of universally designed goods, services, equipment and facilities ...and to promote universal design in the development of standards and guidelines" (CRPD 2006).

- **To encourage cross-sectorial and interdisciplinary work**

Inter-sectorial co-operation strengthens UD initiatives. Actors at different levels and in different sectors should actively promote UD initiatives and realize the good solutions. This is a task for both the public and private sector as well as for NGOs.

Many sectors in society can benefit greatly from co-operation and increased participation by different groups of stakeholders. Sectors which handle community planning, architecture, transport, education, public services, ICT, health and culture are examples where dialogue and co-operation can improve the solutions.

Article 9 of the Convention defines measures to be taken in order to ensure accessibility. These measures include identification and elimination of obstacles and barriers to accessibility, and apply to: Buildings, roads, transportation and other indoor and outdoor facilities, including schools, housing, medical facilities and workplaces; Information, communications and other services, including electronic services and emergency services" (CRPD 2006).

- **To innovate through Universal Design**

Innovation is about anticipating today what the users need tomorrow and understand the users real needs and wishes and the context that the users operate in. Universal Design is about implementing methods of participation from users and professionals In design processes.

All sectors should encourage innovation. Creativity is important when developing new solutions. Education and training in how innovation processes works must be supported. User representatives should be involved in planning, design and evaluation to ensure good usability in the solutions developed.

Article 4 of the Convention obliges signatories to "undertake or promote research and development of, and to promote the availability and use of new technologies, including information and communications technologies" (CRPD 2006).

- **To increase understanding of the benefits of UD within the population**

Increased understanding of the benefits of UD is a prerequisite for gaining support among politicians, citizens and professionals. Continuously information effort and public discussions about UD initiatives are crucial. Concrete cases that demonstrate the challenges, value and potential for individuals and society are instrumental in ensuring continuous and impactful public attention.

The strategy for a sustainable society, where UD plays an important role, is generally not very known within the population. The mindset behind UD often emphasizes how it can bring small but crucial changes for individuals. But a UD strategy also implies more comprehensive changes in priorities in a number of areas such as economy, organization, planning etc.

It is important to understand the arguments for UD and the benefits should to a greater extent be discussed in media and in public debates.

Article 4 of the Convention obliges signatories to "adopt all appropriate legislative, administrative and other measures for the implementation of the rights recognized in the present Convention" (CRPD 2006).

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Feed-back

Welcome to share your views about policies
and best practices in the area of universal design at: **www.udcharter.org**

What are the trends of Universal Design from a European perspective? What is the status of Universal Design both conceptually and in practice?

With this multidisciplinary anthology containing samples from around the globe we have aimed to inspire both practitioners in the field as well as academic work on universal design.