



# Teaching Universal Design

Global Examples of Projects and Models for Teaching in Universal Design at Schools of Design and Architecture.

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European Commission



Directorate-General  
Education and Culture

Leonardo da Vinci Programme



# INTRODUCTION

Universal Design has of recent years become synonymous with a designed world enabling everybody to participate in life and the activities taking place in our society on equal terms. When rooms both outside and inside are designed universally, everybody can independent of size, sensory functionality, physical capacity, or cognitive abilities take part.

Worldwide, there is an increasing interest in as well as understanding of the importance of Universal Design, and an increasing number of people actively try to impart constructive and qualitative design solutions, either based on their professional background or their personal experience.

In Scandinavia, the concept is usually known as "tilgængelighed" (accessibility), but internationally the concepts Universal Design, Design for All, Inclusive Design, etc. are being exchanged. In spite of differences in the precise definitions of the many concepts, they all embrace a general attitude towards the fact that our physical environment and articles for everyday use should be designed in such a way that all people can, to the largest extent possible, participate and use same design, and as a minimum the possibility of adjusting or changing existing design should exist thereby including all persons in a potential user group.

As the examples in this report will show, the numbers and types of teaching models are many and so are the approaches to the problem. It is positive to see how many initiatives and projects that are already living and growing all around and the examples mentioned here are only small parts of what is really going on.

In addition to the projects described here, there are also initiatives to establish professional network for people who are involved in teaching in Universal Design at schools of design and architecture at several levels both nationally and internationally. In the USA, Adaptive Environments has

for a long time been the setting for the network Universal Design Education Program (UDEP), and Elaine Ostroff (Adaptive Environments, Boston) publishes a monthly digital newsletter via the Internet for an international network of teachers. This network consists at the moment of approx. 300 participants and is steadily growing. Elaine Ostroff has also initiated a new website UDEducation for teaching in Universal Design ([www.udeducation.org](http://www.udeducation.org)). The target group of the website is both teachers, who can exchange teaching experience and knowledge, and those interested in learning more about Universal Design/ accessibility.

In England, there is also a professional network, Special Interest Group on Inclusive Design (SIG), co-ordinated by Ruth Morrow at University of Sheffield. In Sweden, an initiative for a professional network of teachers in Universal Design has recently been taken, a Swedish UDEP, aiming at increasing the supply of teaching programmes in Sweden and at the same time co-ordinating a professional dialogue and a teaching forum for people who are already teaching in this field. This forum is co-ordinated by Jan Paulsson from Chalmers' University and Lena Sperling from the University in Lund.

In the following we have described a number of examples of teaching in Universal Design at schools of design and architecture around the world. They are all different and must naturally be seen in relation to the political, educational, and cultural context of the country in question. Still, parallels can be drawn between examples that may generally be divided into two categories; Projects that are initiated by a single person or a group of involved teachers at the faculty in question and projects that are started from a large-scale pilot or research project. It seems that the probability of Universal Design being integrated in the curriculum of the institute of education once the teaching project has been completed is bigger when the project has been part of a large project involving more establishments and not least when the project has been spread over several years. This does not mean that the professional knowledge of Universal Design which

the individual involved teacher possesses at the individual faculties is lost, but that the continuity and the development of the teaching is far more dependent on the individual teacher than is the case at schools that have been involved in a pilot project.

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## DENMARK<sup>1</sup>

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*In Denmark teaching in Universal Design became statutory at schools of design and architecture in 2000. However, there are still big differences as well as fortuitousness in the supply of courses and focused teaching in the field.*

At the School of Architecture at the Royal Danish Academy of Fine Arts in Copenhagen reference has for many years been made to Karen Zahle at the school's housing laboratory when the problem concerned Universal Design. Karen Zahle has included the aspect of Universal Design in her work with senior housing, gerontology and ergonomics. Universal Design has not in any way received specific focus or exclusive attention at the school. Karen Zahle has now retired and the field is open at the Academy of Fine Arts. In spring 2002, a seminar on Universal Design was offered, but it had to be cancelled due to lack of enrolment from the students.

At the School of Architecture in Århus, Universal Design has for years been handled by Poul Østergaard, who is now also retired. Poul Østergaard has conducted focused and intensive courses for the students and since 1995 they have been compulsory for the students at the first

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<sup>1</sup> Sources: Bech-Danielsen, C. and others (Red.): Boase, fremtidens bolig (Future Housing) (Danish Building Research Institute and the School of Architecture at the Royal Academy of Fine Arts, 2001)

[www.nsh.se/Den\\_moderna\\_resan/Finlandia\\_slutkonferens.htm](http://www.nsh.se/Den_moderna_resan/Finlandia_slutkonferens.htm)

Contact persons: Karen Zahle, Copenhagen, Poul Østergaard, Århus

study-level including 1st and 2nd year of study. It is up to the student which year they choose to follow the compulsory course. The course which is still handled by Poul Østergaard lasts two days and is based on a number of lectures given by Poul Østergaard as well as invited consultants, either representing a user group or having a special professional knowledge and insight of the subject. Of major importance for the course is the simulation training taking half a day, where the students in groups of 4, one of the students simulating a sensory or mobility disability, move around in the city towards a predefined place of destination (a home, a museum, a library, etc.). At the selected place there will be a person having a functional residual capacity who can go into dialogue with the students about their experiences and answer any questions. The second day of the course the students prepare a written illustrated analysis of their experiences, which are all collected in a report for subsequent use by both students and other interested persons.

The tendency among the students at the school looks very promising, as they participate actively in the course and express interest. Poul Østergaard believes to be able to see an effect of the teaching in the students' choice of theme in their final examination projects. In recent years there have been an increasing number of projects about Universal Design. Unfortunately, there is at the School of Architecture also a certain amount of hesitation in the field, and after the retirement of Poul Østergaard there is also here a void in the education. Poul Østergaard has published a good deal of information and educational material on Universal Design, among others a new reference book "Tilgængelig Arkitektur (Universal Architecture)" for practising architects.

At research level there is a positive trend, as industrial designer Lone Storgaard in December 2000 publicly defended her PhD dissertation "The Multifunctional Kitchen" at the School of Architecture in Århus, and in Copenhagen architect Camilla Ryhl is doing research for her PhD dissertation "Sansernes Bolig ((Sensory Housing)", on Universal Design for sensory disabled persons. In addition, both schools of architecture in collaboration with the School of Design in Kolding and The Danish Design

School participated in the prize paper "Fremtidens Bolig (Future housing)", which in 1999 was initiated by the Danish Building Research Institute. The competition included Universal Design and sustainability as central topics. In 2001, The Nordic Council of Handicap Affairs arranged the prize paper "the Modern Journey", and in spring 2002 the winners were found and the students from Industrial Design at the school of Architecture in Århus won both 1st and 2nd prize.

In addition to projects at the schools of architecture in this country, it should also be mentioned that for several years supplementary training courses have been offered to post graduate architects wanting to know more about Universal Design. Also the Danish Center for Universal Design is planning supplementary training courses for other occupational groups in the building sector than the architects. They want to be able to offer supplementary training courses in Universal Design to planners, decision makers, artisans, etc.

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## NORWAY<sup>2</sup>

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*The situation in Norway has for the last 5-6 years developed very positively. For the moment, teaching in Universal Design takes place in many architecture and design institutes of education.*

*The positive development is primarily due to an applied and well-defined effort in the form of a four-year pilot project "Husbandens Utdanningsprosjekt", organized by Norway's Husband, and with participation of non-governmental organizations representing handicap groups as well as involved individuals with a big personal interest and professional experience in the concept of Universal Design. Furthermore, it should be added that there is a continuous debate in Norway on the*

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<sup>2</sup> Sources: Rønnevig, T.: "Without dreams, New Reality Cannot Be Created" (2002), article in coming textbook by Jon Christoffersen  
Nizam, K.: "Lov om antidiskrimination i Norge (Act on anti-discrimination in Norway)"?, Article in the magazine Lighedstegn no. 1, 2002  
Contact person: Jon Christoffersen

*introduction of a distinct anti-discrimination act and the Norwegian Ministry of Social Affairs has pronounced that the act should preferably become effective in 2004.*

The objective of Husbanken's project was to strengthen the integration of Universal Design in teaching and education of design-related professional people including architects, designers, planners and engineers. The project took place in the years 1997-2001, and the participating institutes of education were among others the schools of architecture in Oslo, Trondheim and Bergen, schools of planning in Kjeller, Ås and Trondheim, as well as the schools of industrial design in Oslo and Trondheim.

The first step of the project focused on the establishment of contacts to the various groups, information on and discussion of Universal Design in the educational context as well as the establishment of a broadly mixed group of followers for each educational field. The second step was planning and carrying through of the teaching projects and preparation of the teaching material at the various institutions. The last step was end-of-project and conclusion.

The preparation of the teaching material and the educational programme was made and decided locally at the individual school, as there were not enough resources to co-ordinate this part of the project. As the individual schools also have very different structures, processes and traditions, naturally, the effort, experience and results varied a lot. The project is now completed and has been evaluated (Halvorsen, H.K., "Evaluering av Husbankens Utdanningsprosjekt universell utforming av bolig, bygning og utemiljø (Evaluation of Husbanken's Teaching Project Universal Design of Housing, Building and Outdoor Environment)", 2000).

Not all of the institutes of education have after completion of the project integrated Universal Design as a compulsory part of the curriculum, but some have. At the School of Architecture in Oslo (AHO) the architecture line has a compulsory workshop for first year students as an introduction, and the workshop involves both lectures and practical training. In addition,

there is a term paper in one of the later terms based on architecture as a social factor. Furthermore, industrial design at AHO has a compulsory paper in Universal Design in the 2nd year basic study programme, and the concept has been integrated in the existing teaching in other terms. The school of Architecture in Trondheim arranges in collaboration with the school for occupational therapists and the college of engineering a compulsory seminar for 2nd year students. In planning teaching at the Veterinary and Agricultural University in Ås they chose to start by educating and informing the teaching staff and then the Universal Design was included in the school's curriculum and in already existing teaching. The school does not offer any specific courses in Universal Design, but the students will be confronted with the concept in relation to already existing subjects. In planning teaching in Trondheim the students are introduced to Universal Design in the 3rd year and Universal Design is officially compulsory teaching and one of the teachers at the school has developed teaching material for the 3rd year course. Furthermore, they are aiming at developing a Universal Design module to be offered to the students at master level, and in addition they work on including Universal Design in the subject building technology at a high level. Finally, it should be mentioned that the planning teaching programme in Kjeller teaches Universal Design at several levels, and here they have also chosen to integrate the concept in the existing teaching as well as the official curriculum.

*Integration of the Universal Design Curriculum into the five-year architectural Education Programme at the University of Diepenbeek, Academic Year 2001 - 2002.*

#### Facts and principles

The five-year architecture program leads to the diploma of architect. After the initial two years of study (1AR+2AR, candidature), students choosing the Architecture curriculum can graduate as an architect after a minimum of three additional years of study (3AR+4AR+5AR, second cycle).

Universal Design is one of the many concepts shaping architecture, in addition to those related to construction, architectural styles and aesthetic preferences, semantics, economical aspects, functional aspects, safety, ecology, historical aspects, sustainability, etc.

Universal Design is the ultimate client-centred approach, which makes the involvement of real users (with disabilities), awareness training programs, theoretical courses and design assignments of crucial importance in the research programmes.

Ultimately, Universal Design should not be taught as a separate course in the graduate program since this would be against the principles of an integral and inclusive approach. UD should rather be part of all relevant courses and assignments.

Unlike 'design for special needs' and 'physical accessibility' which can partly be checked and measured, 'universal design' is of a more subjective nature and rests on a more holistic approach. Far beyond theoretical insight and precise design principles, there is the fundamental need for a

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<sup>3</sup> Source:

We wish to acknowledge the help of Prof. Hubert Froyen M.Arch., PHL Department of Architecture, Universitaire Campus, Diepenbeek, Belgium for his contribution to this section.

UD culture and spirit in the educational and in the professional setting. Because of this rather undefined nature, all actual UD teaching is somewhat experimental and tentative.

What follows reflects the personal teaching approach of Prof. Hubert Froyen for the academic year 2001-2002.

### Universal Design Curriculum Development

#### **-2AR 'Theory of Architecture'.**

General introduction of the 'Design for All' concept and the 'Universal Design' principles as a specific chapter of the 2AR 'Theory of Architecture' course.

2-hour lecture. Case study: 'Barrier-free EXPO 2000' World Exhibition, Hanover, Germany.

2-hour lecture. 'Human Diversity'. Relevant physical and/or mental impairments and disabilities and their impact on the built environment. 'Handicap Creation' versus 'Handicap Elimination'.

4-hour lecture. 'Handicap, Architecture and Design' CD by Poul Østergaard, Aarhus School of Architecture. Christian Ejlers, Publisher. ISBN 87 7241 191 0

4-hour lecture 'Adaptable Housing' (\*) Dutch-language Design Guide. Froyen H.P., Van Baelen L., Zeelmaekers P., Publisher VZW Toegankelijkheidsbureau, Hasselt, 64 pages. ISBN...

#### **-2AR Assignment: Analysis of the design for an 'Underground House'**

Separate from the 'Theory of Architecture' lectures on accessibility, all 57 second-year students had designed an unusual house below ground level. After the individual design projects were finished and evaluated, students were asked to check the floor plans of a fellow student regarding accessibility requirements.

A formal nine-page checklist summarised all design criteria as mentioned in the theoretical course on 'Adaptable Housing'(\*).

Assignment:

- A. Include a clear floor plan of your fellow student's underground house and check it for accessibility of a wheelchair user. Use the nine-page checklist as a standard.
- B. Summarise your analysis in a written report.
- C. Describe in words the possible redesign of his/her underground house to make it wheelchair-accessible.

### **-3AR-4AR-5AR Experimental Design Studio. 'Growing old in my house'**

Mixed teams of 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> year students select one of the proposed topics for a one-week full-time design studio.

For the 'Growing old in my house' theme, people older than 60 were invited to work in teams with two students of architecture. The elderly were recruited in the local community through a newspaper ad and 9 singles or man-wife teams were finally selected to work with 23 students. Old and young attended a series of theoretical introductions on design criteria for 'Life-time Homes' and each team used the 105-page Dutch-language design guide 'Levenslang Wonen' Platform Wonen van Ouderen, Ministerie van de Vlaamse Gemeenschap, April 1999.

Next, the owner-occupant/student teams went out and thoroughly analysed the individual private homes, and the students of architecture carefully listened to the needs and wishes of the users.

Students then started redesigning the house for their client. Finally, students and clients discussed the proposed home modifications in a full afternoon session.

### **-3AR First-semester Theoretical Course. 'Design Methodology and Design Methods'**

Among other Field Specific Design Methods, 'A *Pattern Language*' approach, elaborated by Prof. Dr. Christopher Alexander at UC Berkeley (USA) in the mid seventies, is studied in great detail.

Alexander decomposes the built environment into the smallest possible 'atoms and molecules of the environmental structure'.

At this smallest level he then analyses recurrent '*patterns of events (Functions) which are always interlocked with certain geometric patterns in the space (Morphology)*'.

This purely empirical study leads to the formulation of what he calls 'patterns'.

For example 'Guests entering a Hotel', could be such a pattern and it could, on one hand, contain all empirical facts and data related to the activity and the experience of entering a hotel and, on the other hand, the same pattern could describe the characteristics of the architectural space and the morphology of a setting for this event.

In preparation for the second-semester 'Universal Hotel' design project, third-year students were asked to explore the 'Pattern Language' design method in a three-step process:

#### **\_ Phase 1**

Students analyse design data for different distinct parts of a Business and Family Hotel.

Access, Entrance, Reception, Lobby, Bar, Traffic, Room, Bathroom, Restaurant, Fitness Centre, Conference Centre, etc. All this is done from the perspective of the hotel guest (front of the hotel).

#### **\_ Phase 2**

Students gather data on design-relevant characteristics of users, focussing on their possible temporary or permanent (dis-)abilities:

-Physical (dis-)abilities, related to static and functional body dimensions, reaching envelopes, range of movement, exertion of force, etc.

-Psychomotor (dis-)abilities, related to fine motor skills, balance, reaction time, etc.

- Sensorial (dis-)abilities, related to the visual, auditory and tactile system.
- Cognitive (dis-)abilities, related to interpretation of information, knowledge, how to understand and use, etc.

Students focus primarily on the related design interventions that could eliminate potential handicaps for these documented (dis-)abilities.

#### \_ Phase 3

Students make a synthesis of results found under Phase 1 and under Phase 2, and they write a series of Patterns in which, for each functional unit of the 'universal hotel' (Access, Entrance, Reception, Lobby, Bar, Traffic, Room, Bathroom, etc..), they suggest design solutions that are barrier-free.

#### -3AR second-semester Design Project. '**Universal Hotel**' 15 weeks.

The hotel is chosen as a building type to explore and to integrate the principles of 'Universal Design' because a hotel is a public building, which should be fully accessible, but also has the characteristics of a (temporary) home.

Fifty third-year students will each design a 130-room Business and Family Hotel, focussing mainly on the various needs and wishes of the largest possible variety of visitors and users.

Throughout the design process, students will be assisted by experts from Radisson SAS Hotels & Resorts as virtual clients, and by architects of the 'Toegankelijkheidsbureau' (Office for Accessibility). People with disabilities will advise the students and participate in the final evaluation.

#### Tentative conclusion

Teaching Universal Design is quite new and experimental. Schools involved in teaching UD should:

- collaborate
- communicate
- conduct research.

To this end, three Belgian schools of architecture have joined forces. In the period from October 2001 to October 2002, three researchers, one from each school, are meeting one day each week to develop the UD Curriculum further and also to prepare a similar 'Universal Hotel' design project for the academic year 2002-2003. Students of architecture will simultaneously work on the same assignment in three different places.

In a next phase, additional design disciplines will be involved.

The creation of a European Thematic 'UD Education' Network under the EC Socrates program is one possibility for linking the Belgian experience to the European level, and vice versa.

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## FRANCE<sup>4</sup>

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To the best of our knowledge there is just one education course particularly addressing the needs of disabled people (a course organised by The Special School of Public Works, comprising of a 2-day introduction in the Paris area, costing 548.82). There is no introductory course for students of architecture nor any continuing education course offered for practicing architects.

Recently there was a course for students of architecture at the l'Ecole d'Architecture de Paris La Villette, offered by Louis-Pierre Grobois; this professor retired last year and has not been replaced.

Following the commitment of the Member States of the European Union to national Centres of Excellence in Design for All, the schools of architecture are currently being canvassed in this regard by the Ministry of Education.

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#### <sup>4</sup> Sources:

We wish to acknowledge the help of Catherine GUYOT, architecte – urbaniste, President of ARVHA and Luc GIVRY, ARVHA, project manager, for their contribution to this section.

#### Contact:

ARVHA, 75, rue des archives 75003 PARIS. TEL : 0033 1 42 77 34 FAX : 0033 1 42 77 34 30  
e-mail : arvha@noos.fr web site : www.arvha.asso.fr

As of mid-September 2002 there has been no further announcement about this activity.

As regards provisions for disabled people in the French legislation, there are several Building Codes in the areas of construction and residential buildings as well as in urban design. Four French national Accessibility Norms have also been published between 1978 and 1996, with dimensional and other requirements for the design for the built environment and for public transport.

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## ENGLAND<sup>5</sup>

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*England has like Australia passed an act on anti-discrimination "Disability Discrimination Act" of 1995, and has thereby created a basis for a necessary development of the field of Universal Design at the schools of design and architecture.*

*Work is being done to establish and formulate courses and study units at several universities in England, and this document will only mention a few of the many examples.*

*Furthermore, based on their interest and experience in this field of teaching a group of teachers have established a network Special Interest Group on Inclusive Design (SIG), trying to define the general framework of teaching in Universal Design at the relevant institutes of education in England.*

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<sup>5</sup> Sources:

[www.rdg.ac.uk/ie](http://www.rdg.ac.uk/ie) (08-04-2002)

[www.scpm.salford.ac.uk/surface](http://www.scpm.salford.ac.uk/surface) (08-04-2002)

<http://cebe.cf.ac.uk/aee/abstract> (25-03-2002)

[www.udeducation.org/teach/program\\_overview/program\\_infused/M/manley.htm](http://www.udeducation.org/teach/program_overview/program_infused/M/manley.htm) (27-03-02)

Aaen, R, Volsgaard, A., Timm-Andersen, M: Udvidet brugeropfattelse (Extended user definition) (Aalborg Universitet, 2001)

Contact persons: Ruth Morrow, Sheffield

University of the West of England (UWE), School of Planning and Architecture, has integrated Universal Design in their prize awarded 4-year bachelor programme in Architecture and Planning.

The programme has been developed in collaboration with the Royal Institute of British Architects (RIBA), Architects Registration Board and the Royal Town Planning Institute, and has been approved by qualified professionals.

Instead of introducing Universal Design as an individual factor in the education, the 4-year educational programme is based on 3 recurrent themes; "People", "Context" and "Sustainability". The purpose is that the students should not see the individual factors as independent of each other, which is often the result, when the themes stand alone as a separate course, but obtain a natural attitude towards Universal Design in relation to other relevant factors. The theme "People" includes the concept of Universal Design and includes more precisely the 7 Universal Design principles (see appendix 1 and [www.design.ncsu.edu/cud/](http://www.design.ncsu.edu/cud/)). The goal of the "People" theme is to give the students a basic understanding of the diversity among potential users and clients. The project describes the phase of criticism in the design subject as essential to the students' process of cognition. Here the three main themes are discussed explicitly and constitute the basis for the project evaluation.

The programme results after 4 year in the bachelor degree "BA in Architecture and Planning" and a diploma is issued.

Furthermore, two different research centres under Salford University and University of Reading, respectively offer a Master Degree in Inclusive Design.

At Salford University, the teaching programme is offered by Salford University Research Focus on Accessible Environments (SURFACE), which is a research centre under School of Construction and Property Management. The teaching programme is based on part time studies and is aimed at persons working in the building, health, and social sector. Only a bachelor degree in a relevant subject is needed and people without a

university degree who are interested can qualify by passing a test prepared by the university. In addition, the centre offers a 5-day introductory course, if the person in question has not worked in the field before. The course is offered as part time studies in the evening or as distance learning via the Internet. Either a Postgraduate Certificate (10 months), a Postgraduate Diploma (18 months) or a Master of Science (24 months) may be obtained.

The courses were established subsequent to a user survey made by SURFACE among 2100 practising designers, from which 916 responses were received, and the conclusion was that the designers were keen to design inclusively, but there was a general lack of knowledge and education in the field.

The course at University of Reading also offers the possibility of studying part time and thereby obtaining a Master Degree in Inclusive Design. The programme is divided into 6 modules covering the themes Sensory Impairment, Legislation, Transport, Access Management, Colour and Lighting and Design and User Need, and they can be included in a focused Master Degree or as separate modules in an individually planned course of study.

Furthermore, it is also important to mention the work of Roger Coleman for the development and the dissemination of Universal Design. Roger Coleman is today the manager of the Helen Hamlyn Research Center, under the Royal Institute of Art (RCA) in London, and, furthermore, he has established DesignAge at RCA in 1991 and European Design for Ageing Network in 1994.

The centre is working with development of Inclusive Design products and is undertaking research in the importance of society development for product design. Besides, the centre arranges exhibitions and competitions and frequently publishes publications. Roger Coleman has had an incredibly large impact on the process and the development of this field in England, and he has particularly focused on getting young designers to

understand the importance of linking the disablement problems with the ageing factor. "We can all expect to get old and therefore we can all expect to become disabled, unless we change the world we are living in", he says.

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## IRELAND<sup>6</sup>

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*In the years 1998-2000, a research project financed by the EU was carried through at the School of Architecture at University College in Dublin, Ireland. The project is also called the Dra Ware project.*

The defined objective of the project was to contribute to a universally designed environment via the architect study programme. The aim of the project was also to test different teaching methods on students of different years.

After having defined which factors could be a challenge during the process, it was deliberately chosen to implement the concept of Universal Design at several levels in the existing curriculum. It would not be satisfactory only to introduce the concept in design-studios, but Universal Design should equally be included in lectures, history and theory teaching, building technology subjects and not least in the supplementary training courses for the teachers. It was, furthermore, important in connection with the project, that the concept of Universal Design was introduced to as many students of different years as possible.

The teaching activities of the project included the following:

Existing lectures in the 3rd year with the title "Ecology of Architecture" included a number of lectures on subjects such as the visual, the tactile, the conceptual and the cognitive environment.

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<sup>6</sup> Source:

Morrow, R.: Universal Design Handbook, chapter 54 (red. Preiser and Ostroff, McGraw-Hill 2001)  
Contact person: Ruth Morrow, Sheffield

3 seminars focusing on Universal Design integrated in existing history/theory seminar for 4th year students. The seminar resulted in a written report and the 3 themes on Universal Design had the following titles: "Normal People and their Everyday Lives", "Perception, Representation and Designing for the Senses" and "Voices from the Margin".

Introductory course for 1st year students "Introduction to people and spaces" consisting of two workshops; "Using your Body" and "Avoiding the Visual".

A design-studio project for 2nd and 4th year students "Stories of everyday Living"

A building technology course for 4th year students, growing out of the mentioned theory seminar "Designing for People". Here the students put their theories into practice and build a 1:1 model.

Design-studio based on a real local need for a new home for the elderly. The course "Residential Centre for People with Severe Physical and Sensory Impairments and Housing for the Elderly" was a term project across different years of students to a large extent involving an existing local user group as consultants.

The greatest challenges that occurred during the process were all related to the, for the students, unaccustomed situation that the tasks were based on existing problems and included relevant consultants and critics during the process. The students thereby met a requirement for understandable and readable representations of their projects that resulted in revised methods in relation to scale, models, drawings and multimedia. Also the students were confronted with their own set views and (re)use of existing housing types in relation to the current situation of the task, not least the emphasis between analysis and design based on the prioritised use of consultants and user feedback.

The conclusion of the project was that especially the involvement of the consultants had a significant impact on the students' general understanding of factors such as, communication, representation and user

analysis in their design process. Furthermore, the mutual process of communication was indicated as being instructive and informative for both parties, and both students and consultants found that they had learnt a lot about the other party during the process. It is essential that the project maintains that the positive influence the use of consultants has on the students' understanding of human diversity only can be achieved if the consultants are not only used as design consultants but also are involved in the process of evaluation.

The findings of the project also showed that it would take time before the concept becomes a natural part of the consciousness of both students and teachers, and the advocates of the subject must necessarily, on an ongoing basis, be critical as to where and how Universal Design is included as a natural factor in existing teaching.

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## USA<sup>7</sup>

*In the USA, the Congress passed in 1990 "the Americans with Disabilities Act" (ADA), which ensured disabled people the right, among other things, to physical access to all public and commercial buildings. Besides the increased demands naturally made on designers and architects as a consequence hereof, the schools of design and architecture were also committed to teach in subjects concerning ADA. However, it is not all schools that are yet practising focused teaching in Universal Design.*

*There is no general co-ordination or management of Universal Design teaching programmes, however, most examples are linked by research funds or network, e.g. Universal Design Education Program (UDEP).*

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### <sup>7</sup> Sources:

Welch, P., Stanton, and J.: Universal Design Handbook, chapter 51 (red. Preiser and Ostroff, McGraw-Hill 2001)

Lifchez, R.: Rethinking Architecture (University of California Press, 1977)

[www.udeducation.org/teach/program\\_overview/program\\_infused/D/duncan](http://www.udeducation.org/teach/program_overview/program_infused/D/duncan) (27-03-02)

Kontaktpersoner: Ricardo Gomez, SFSU, Steven Truesdale, SUNY

[www.design.ncsu.edu/cud/](http://www.design.ncsu.edu/cud/)

[www.ap.buffalo.edu/idea/](http://www.ap.buffalo.edu/idea/)

*UDEP is a development programme initiated by Adaptive Environments Center, Boston in 1989 and approx. 30 different schools are part of it.*

We have chosen 4 examples from different schools across the country, also representing four different models;

NCSU - North Carolina State University, Center for Universal Design

SUNY- Buffalo, New York State University

SFSU - San Francisco State University, Industry and Design

USC - Andrus Gerontology Center, University of Southern California

NCSU and SUNY are both research centers with compulsory teaching at the universities they are under, and both centres offer teaching programmes in different ways and at all levels, and act to a large degree as consultants themselves. Furthermore, they are collaborating in doing a research project. The teachers in both centres generally hold a designer degree and are also researchers, and both centres often use well-established consultancy networks that are being involved in all steps of the process. Also, both models offer the possibility of further concentration for students at Master and PhD levels, as the possibility of specializing professionally in Universal Design exists here.

SFSU is a good example of a successful integration of the principles of Universal Design in the design process and teaching. The department of industrial design has previously offered specific term courses in Universal Design, where the course aimed at giving the students an understanding of the concept of Universal Design and the course of life integrated in a general awareness of environmental issues. SFSU has a long tradition of setting reality-based tasks and offering themselves as proposers to any local users. Therefore, a large network of user consultants has been established frequently involved in several steps of the teaching course. At the moment, there are no specific courses of Universal Design, but the students are expected to include the principles and knowledge of Universal Design in their products as well as other necessary aspects of a design process. Consequently, there is no specific focus on Universal

Design, but a thorough and professional introduction to philosophy and principles is the basis for all teaching.

USC differs from the other programmes, as this model is an on-line course in 4 modules. The teaching programme is offered on the Internet and is available for everybody with access to a computer. The course is based on weekly lectures, followed by relevant assignments. Now and again invited experts lecture and it is up to the individual student to involve the necessary consultants with the relevant professional and personal expert knowledge in connection with the assignments given during the course. This model is the only one offering a specific diploma after completion of the 4x4 weeks' modules. No advance knowledge is required to participate in the course, and the students usually have a background in the design occupations and they often already work with solutions for Universal Design in their everyday lives. Many seek this course as a supplementary training course.

For all 4 models apply that the teachers have a background in architecture and design, or ergonomics, or physiotherapy, but besides that no organized education in Universal Design. They are all driven by their involvement and their professional and personal experience. In addition, almost everybody is in a teachers network (UDEP) for professional dialogue and exchange of experience. In connection with international Universal Design conferences there is often a special workshop for the UDEP network, where all other teachers interested in Universal Design are welcome.

All four models are to a large extent involving consultants in their teaching programmes, mainly disabled persons, but also to a certain extent occupational therapists and other relevant professionals. The consultants are mainly used as introductory speakers and commentators. They are rarely involved as a hands-on target group, which is probably due to the experiences from among other the very well-documented teaching project at Berkeley in the late 1970s, where architect Ray Lifchez as responsible

project manager found that the collaboration was most useful, if the disabled consultants just commented on the projects without pretending to be the future users. The dialogue thereby focused on general aspects of a disability rather than on personal preferences.

The general experience in the USA seems to be that the concentrated workshop as a one-time course works positively, as it generates focus on the problem and easily can be integrated in an already existing teaching programme. On the other hand, the drawback is that the subject field is maintained as separated from and specific in relation to other subjects, when the issues are not naturally integrated in the already existing teaching programme in line with other aspects such as aesthetics and technology.

Generally in the USA, simulation training is widely used and those supportive of this method maintain that the hands-on experience has a significant effect on the students' perception of the problem, whereas those critical of the method point out that short term simulation just increases prejudice against living with a functional residual capacity and that only long term simulation over a period of several days or weeks will give a realistic picture of the real situation.

The experience based on term courses in the USA is extremely positive, particularly in cases where Universal Design has been integrated in other professional issues. This provides a possibility for the students to dig deeper into the problems and they do not see design exclusively as an issue of shaping but also as a moral, ethical, political, and technological issue.

*In 1992, Australia passed the "Disability Discrimination Act", thereby creating the basis for a positive development in relation to teaching in the Universal Design subjects. In Australia there has not been any organized initiative to implement or develop Universal Design in the schools' curriculum. The existing courses and actions at the individual schools of design are due to individual persons' involvement, interest and initiative. There is no co-ordination or professional collaboration in relation to Universal Design outside the framework of the individual institute of education.*

*This document concerns itself with the design and architect teaching programmes at the University of Western Australia (UWA) in Perth, and Queensland University of Technology (QUT) in Brisbane.*

In the years 1996-1999 UWA carried through a pilot project divided into two different term projects. The project aimed at investigating whether an integration of the UD concept in the school's curriculum would influence the students' perception of the concepts diversity and human rights positively in their design processes. The first assignment focused on cultural understanding through collaboration with a group of aboriginals. The second assignment of the project dealt with disabilities and Universal Design and will be further described.

The teaching staff consisted of 3 teachers; one architect, one artist and one art historian. Furthermore, the project had means to employ 6

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<sup>8</sup> Sources:

Pedersen, A.: Universal Design Handbook, chapt 53 (red. Preiser and Ostroff, McGraw-Hill 2001)

Lecture by R. Goonewardene, Universal Design Conference, Providence, USA June 2000

<http://www.dbe.bee.qut.edu.au/research/R&DesAge/Grad%20Certificate/gradcert.htm>

<http://www.dbe.bee.qut.edu.au/research/R&DesAge/Grad%20Certificate/lecture.htm>

Contact persons: Anette Pedersen, Perth, Romesh Goonewardene, Perth, Murray Mountain, Melbourne, Francesca Davenport, Melbourne and Malgosia Zlobicki, Brisbane.

consultants who all had different disabilities and who were active during the whole teaching course. Furthermore, an occupational therapist and a landscape architect as lecturers and professional consultants. The task set was a sweatshop in connection with an international conference on Universal Design, and the course lasted one term.

The employed consultants acted as user representatives, experts as well as critics during the course. They were mostly involved at the beginning of the assignment, but participated also in the final handing in of the assignment. The project concluded that the participation of the consultants in the final phase was problematic due to lack of experience and professional knowledge and recommended future projects to carry out a qualified selection.

In the preliminary stage of the assignment the project used different exercises. The first should give the students an increased understanding of the problems and was a registration of physical obstacles and possibilities in a physical environment well-known for them; their own campus. Each group followed a disabled consultant around the campus and observed problems, if any. The project had deliberately chosen this exercise rather than simulation training where the students themselves should have moved around as "blind, deaf, or wheelchair users", however, some of the students carried through a simulation either on their own initiative or on the consultant's. Also a measuring exercise was carried through, as part of the introductory phase, focusing on the individual consultant's physical size and reach. This exercise included registrations of measuring, mobility pattern and life drawing.

The project managers regarded the ongoing contact with the disabled consultants as extremely positive, and the final findings of the assignment showed that most of the students had gained a significant understanding of and insight in the aspect of Universal Design. Especially the daily confrontation with the disabled consultants was stressed as being important, to experience the relations between room and body, when the consultants with or without aids moved around in the studio was instructive and thought provoking for the students. Furthermore, the reality aspect

was emphasized as being positive; the close contact and the dialogue of the students with the users, as well as the fact that both the registration phase and the design phase were placed outside the campus in the existing world was considered important for the cognitive process of the students.

The project was regarded as successful by the participating teachers, but has not lead to courses with specific focus on Universal Design. Universal Design is now included in the school's curriculum as well as in the evaluation and examination criteria applied. Besides, teachers experience an increasing interest and inclusion of the concept of Universal Design among both students and colleagues and thereby believe to be able to register a changed positive attitude to Universal Design subsequent to the completed project.

At Queensland University of Technology, School of Design and Built Environment in Brisbane a supplementary training course over a period of one year is offered. The course aims at introducing design aspects as well as social and legal aspects of "Design for Ageing" to the students. The course links the ageing aspect with Universal Design and is based on both the Universal Design principles (see appendix 1) and the philosophy of Inclusive Design.

The target group of the course are different occupational groups working with the field in their daily work and includes designers, architects, planners, engineers, administrators, occupational therapists and physiotherapists as well as other occupational groups in the building and health sector. The course is divided into 4 modules; 1) Criteria of Design for Ageing, 2) Performance of Design for Ageing, 3) Evaluation of Design for Ageing and 4) Realisation of Design for Ageing. Module 1 and 4, both lasting one term, are offered as on-line education on the Internet and the teachers emphasize the flexible structure of the course obliging the individual working situations of the students. Module 2 and 3, both of a period of one week, require the presence of the students at the university campus in Brisbane, and therefore take place between terms, as

traditionally, Australia has a long winter vacation in July-August. The course focuses on Australian situations seen in relation to global aspects and the course is also open to international participants. A completed course results in a "Graduate Certificate in Designed Environments for Ageing".

## JAPAN<sup>9</sup>

*The Japanese society faces a rapidly growing population group of the age of 65 plus. Within a few years the ageing group will represent more than 20% of the population. This development demands a redefinition of the user perception and makes special demands on designing and planning of for instance the transport sector, housing and product design.*

Based on these new user definitions and future market changes, a 4-year pilot project was carried through during the years 1996-2000 between the established design company the NEC Design Group and the department of Industrial Design at Tama Art University.

The ambition of the project was not only to incorporate a basic understanding of the concept of Universal Design in the education programme, but to do it in connection with linking education and practice, collaborating with the industry and understanding the work processes of the industry.

As the project was also a learning process for the involved management parties, a new theme of work was chosen each year and the degree of complexity was then intensified concurrently with the management parties increasing their degree of knowledge. The themes were:

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<sup>9</sup> Source:

Ikeda, C. and Takayanagi, N.: Universal Design Handbook, chapter 55 (red. Preiser and Ostroff, McGraw-Hill 2001)

1996: Supporting People (no specified user group or technological limitations)

1997: Senior User-Friendly Information Equipment (user group as ordinary user or older)

1998: A New PC for Senior Citizens and First-Time-Users and an Easy-to-Use Public Information Terminal (broadly defined user group including disabled persons)

1999: Universal Design Public Terminals (precise user requirements and first time real product development were part of the programme).

Essential to the project was to establish a mutual understanding of the concept of Universal Design and the real user requirements and definitions. 6 Universal Design workshops were arranged for all involved parties; 1) Who Are the Users with Disabilities, 2) Discovering Barriers in Familiar Environments, 3) Virtual Disability Experience, 4) Virtual Senior Citizen Experience, 5) Discovering Barriers in the Theme Products, and 6) Redesigning Familiar Objects with Universal Design Concepts. Common to these workshops was the attempt to make the participants understand on their own body through examples, analysis and simulation training what the essence of the problem was.

Besides the mentioned workshops, the project placed great emphasis on involving the potential user group. Hearings with older people and disabled people were arranged and through interviews, user observations and on site registrations of the users, the students gained an insight in the current problems of everyday life for the user group as well as an increased understanding of their wishes and thoughts. Based on the everyday life of the user group an all-day task programme was prepared which the students used when they observed the individual user to assess their physical ability and to register the barriers of everyday life. Besides these close analysis the students also did interviews in the street with persons selected at random as well as video based behavioural analysis. This part of the project constituted almost 50 % of the students' work and was

considered the most important part of the project and basic for the further planning of the conceptual work.

In the course of the development process of actual design objects, the students always went back to simulation training for the product evaluation. To maintain the real situation for the users, the products were tested while using wheel chair, blind stick, or increased weight loads on legs and arms, and furthermore consistently tested by all involved project parties to ensure a mutual basis for discussion and to avoid a one-sided and individual assessment. The consultants representing the potential users were also taking part in the entire process.

In relation to the concept of Universal Design the project was considered as extremely successful and the visible results are that a new curriculum for teaching in Universal Design was prepared and has now been fully integrated in Tama Art University's teaching programme. Furthermore, as regards the industry, processing instructions were prepared in relation to development and production of Universal Design products as well as an efficient marketing of the products. In addition, the NEC Design Group has prepared 5 design guidelines now used in the company's work.

Also the findings of this pilot project finally shows that teaching design and architect students about Universal Design is the most efficient way to promote understanding of the concept of accessibility and that teaching in general provides the most important tool in the work of increasing understanding of the concept of Universal Design.

# Appendix 1

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## Universal Design 7 Principles

Centre for Universal Design, North Carolina State University.

[www.design.ncsu.edu/cud/](http://www.design.ncsu.edu/cud/)

### **1. Equitable Use – The design is useful and marketable to people with diverse abilities.**

- Provide the same means of use for all users: identical whenever possible; equivalent when not.
- Avoid segregating or stigmatising any user.
- Provisions for privacy, security and safety should be equally available to all users.
- Make the design appealing to all users.

### **2. Flexibility in Use – The design accommodates a wide range of individual preference and abilities.**

- Provide choice in methods of use.
- Accommodate right- or left-handed access and use.
- Facilitate the user's accuracy and precision.
- Provide adaptability to the user's pace.

### **3. Simple and Intuitive Use – Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills or current concentration level.**

- Eliminate unnecessary complexity.
- Be consistent with user expectations and intuition.
- Accommodate a wide range of literacy and language skills.
- Arrange information consistent with its importance.
- Provide effective prompting and feedback during and after task completion.

### **4. Perceptible Information – The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.**

- Use different modes (pictorial, verbal, tactile) for redundant presentation of important information
- Provide adequate contrast between essential information and its surroundings.
- Maximize "legibility" of essential information.
- Differentiate elements in ways that can be described

- Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

**5. Tolerance for Error – The design minimizes hazards and the adverse consequences of accidental or unintended actions.**

- Arrange elements to minimize hazards and errors; most used elements, most accessible; hazardous elements eliminated, isolated or shielded.
- Provide warnings of hazards and errors.
- Provide fail-safe features.
- Discourage unconscious action tasks that require vigilance.

**6. Low Physical Effort – The design can be used efficiently and comfortably and with a minimum of fatigue.**

- Allow user to maintain a neutral body position.
- Use reasonable operating forces.
- Minimize repetitive actions.
- Minimize sustained physical effort.

**7. Size and Space for Approach and Use – Appropriate size and space is provided for approach, reach, manipulation and use regardless of user’s body size, posture and mobility.**

- Provide a clear line of sight to important elements for any seated or standing user.
- Make reach to all components comfortable for any seated or standing user.
- Accommodate variations in hand and grip size.
- Provide adequate space for the use of assistive devices or personal assistance.

## Appendix 2

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### Project “AAOutils”: Architecture and Accessibility Tools for Training

On 15<sup>th</sup> February 2000 the Council of Europe adopted a resolution to introduce the principles of “Universal Design” to school programmes for professions involved in the built environment (Resolution ResAP 2000).

On 25<sup>th</sup> and 26<sup>th</sup> April 2001 this resolution was approved at a meeting of European experts in accessibility. This meeting was organised under the Swedish Presidency of the European Union at Linköping, Sweden.

Despite this new European legislation in favour of accessible architecture and Design for All, few training schemes are officially organised to provide the necessary knowledge to apply these laws and standards. Architects and designers of projects are the first to admit their lack of knowledge in this field. Yet accessibility is not something that can be improvised; it depends on definite standards.

The AAOutils project is designed to fill this void by designing teaching tools that can provide a basis for specific professional training in architecture. The project is co-funded by the European Union LEONARDO Programme and takes place between 1.11.2001 and 31.10.2003.

The main objective of the AAOutils project is to design innovative teaching tools based on the concept of architecture accessible to all (and thus also to disabled people or people with limited mobility) in an extension of the spirit of Design for All. Using these tools, training schemes can be implemented both at national and European levels.

These tools should indirectly help to integrate disabled people socially and professionally, which will make it possible to:

- Make architects and architectural students aware of aspects of accessibility and Design for All,
- Increase the number of young disabled people in schools and universities. At present lack of accessibility to premises prevent many of them from attending the courses they wish to pursue.
- Provide better access to jobs for handicapped people by removing architectural barriers on working premises and access networks.

Accessibility must be made a priority architectural criterion, just like market criteria such as financial considerations, heritage conservation, the environment, energy saving, etc..

The partners of the AAOutils project are :

ANLH, Belgium: (Coordinator). The ANLH is an association of disabled and able-bodied people. Its aim is to promote social integration of severely physically disabled people by

ensuring that they are provided with housing conditions and an environment suited to their needs.

IAD: Institute of Architecture and Design, University of Aalborg, Denmark: Research carried out by the Institute of Architecture and Design (IAD) is organised in the context of research programmes in and through the subjects: Urban planning, Architecture and Industrial design. Design for All is an integrated part of planning and design studies at IAD.

ARVHA: Association pour la Recherche sur la Ville et l'Habitat, Paris France, is a non-profit making organisation devoted, on the one hand to conducting research in the built environment and in architecture and its physical and social environment, and, on the other, to organising vocational training for architects.

SARP: Union of Polish Architects is a voluntary organisation founded in 1934. Its members include about 6,000 out of the 10,000 architects in Poland. Its aim is to encourage the quality of architecture and the profession of architecture.

Further information is available at the project Web site: <http://anlh.be/aaoutils/>

This report was produced by the architects:

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for **AAOutils**, 2002.

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Bjarne Kennig and Camilla Ryhl (2002). "Teaching Universal Design - Global Examples of Projects and Models for Teaching in Universal Design at Schools of Design and Architecture", AAOutils, ANLH, Brussels.