WEI

2018 WEI

INTERNATIONAL

ACADEMIC
CONFERENCE PROCEEDINGS

BARRIERS AND POSSIBILITIES TO TEACHING UNIVERSAL DESIGN IN HIGHER EDUCATION IN NORWAY

ULF RYDNINGEN AND PHUOC TAN LE

ABSTRACT

Implementation of universal design (UD) e.g. within the design of high-rise dwellings, school buildings, public offices available to the public, and public transportation, is currently required by law in Norway. In the planning and design of the Built Environment, traditionally the architects, civil engineers, urban planners, and landscape architects play an important role. The knowledge they possess influences strongly how the built environment is designed, built, maintained and used. In order to achieve good usability and accessibility, it is also required by law to involve representatives for the disabled persons' organizations into the local planning processes. However, other important professions do not have the same tradition of being involved in the planning processes of the built environment. In particular, this applies to the health professions, which can contribute with their knowledge background about of how to improve peoples' ability to perform tasks in their daily living and working environments. Their views often come too late into planning processes, and changes will therefore either not be possible or will be too expensive to implement. Universal design is an interdisciplinary theme, which should be current knowledge for many different professions. Here we have looked at how universal design is taught in different professional education programs in Norway, and investigated some university professors' attitude towards teaching their students about UD.

Introduction

In Norway, an overall goal is to develop an equal society, and to ensure equal opportunities and rights for community participation for all. Universal design (UD) is a strategy for achieving this goal in all areas of society. Universal design refers to broad-spectrum ideas meant to produce buildings, products and environments that are inherently accessible and usable to people with disabilities as well as older people and people without disabilities. The term 'universal design' was coined by the architect Ronald Mace to describe the concept of designing all products and the built environment to be aesthetic and usable to the greatest extent possible by everyone, regardless of their age, ability, or status in life. (The Center for Universal Design, 2008). There is a growing interest in universal design, and there are many higher education areas in which universal design is having a strong focus, but there are also many others in which it has not yet been adopted to any great extent. The term Universal Design is used in many fields for example when it comes to design of buildings and outdoor areas, when planning of information and communication technology so that the tools can benefit all. In higher education UD is important in planning of study programs in view of the diversity of student masses, and in new methods of teaching and learning that provide increased student quality for all. Research and knowledge development on universal design takes place within several subject areas, like ICT, Architecture, Civil Engineering, Product Design, Planning, Public Health, and Occupational Therapy. Previous research in teaching universal design has among others been on 'strategies for teaching inclusive design' (Dong, 2010), on 'inter-professional collaboration and education' (Hitch, Larkin, Watchorn, & Ang, 2012; Karen P & Bush, 2010; Rydningen, Norenberg, & Lid, 2016). Then, the need for new knowledge production, and to decide what knowledge is essential to learn is also studied (Budge, 2009; Heitmann, 2005; Imrie, 2000; Turner & Turner, 2011).

Required competencies on universal design

Today, universal design has won a political and legal approach nationally, internationally and is included in both Norwegian legislation, the UN Convention on the Rights of Persons with Disabilities (CRPD), and in several other political, legal and technical documents (Lid, 2013).

Some essential competencies of practice for health and social care education is described in national regulations for health and social care education:

> *The candidate has knowledge of inclusion, gender equality and non-discrimination, regardless of sex, ethnicity, religion and philosophy of life, disability, sexual orientation, gender identity, gender expression and age, so that the candidate helps ensure equal services for all groups in society.*

There are no written detailed demands to competencies on universal design for the occupational therapy, the social educators or other health professionals in the national regulations for higher education. Neither is there national regulations demanding civil engineers, planners or architects to learn about universal design in their professional training. Then, what is taught about universal design is assumed to be random and linked to the fact that some teachers have particular interest in this topic. However, so far the scope and attitude to the teaching of UD in Norwegian university courses has not been investigated. We will look at how universal design is taught about, in the education of different professions in Norway, and investigate university professors' attitude towards the UD. Our research questions is therefore: 1) what do students learn about universal

design during their education? and 2) What is the main barriers to teaching universal design in Norwegian higher education?

Knowledge development

Indirectly, there is a requirement for various professional skills, as a result of adopted national legislation and international obligations. The 2009 enactments of 'the Discrimination and Equality Act' and 'the Building and Planning Act' in Norway, put demands on knowledge and understanding about UD, and is therefore something that various occupational professionals need to know about in their professional practice. Article 4 in Convention on the Rights of Persons with Disabilities (CRPD) emphasizes that implementation of universal design require new knowledge, to have an understanding of both the necessary measures, rights and awareness about problems that people with disabilities experiences. Lid (2013) have proposed an interpretation of UD that distinguishes between three levels - a macro level, then a meso-level and last an individual level.

Table 1 UD understood in three levels (Lid, 2013)

Knowledge level	Base Knowledge
Macro	Ethical concept, concept of human, human rights, UN-convention (CRPD), Local Master planning
Meso	Technical standards, design of services for elderly and disabled, implementation of plans and regulations. Knowledge of other professions knowledge base and cooperation.
Micro	Individual experiences. Knowledge of how architectural barriers occur and who experiences them

The research design and methodology

In this study, an online-questionnaire have been distributed to a sample of Norwegian university teachers, in order to reveal their attitudes to, and knowledge about UD. The respondents are also asked to answer which UD themes they teach (if they are teaching about UD), and the most important barriers to teaching about UD.

Respondents is grouped as 'Architects' if their educational background is within Architecture, Landscape Architecture, Town and Regional Planning studies or Design. The category 'Health Sciences' includes university educators of Nurses, Occupational Therapists, Physioterapists, Social Educators. Social sciences includes political scientists, sociologists, or human/social geographers. 'Civil Engineering' also contains architectural engineers.

These educational groups are chosen because candidates from these educational programs most frequently ends up as Town Planners, or executive officers for planning permits or to advisory committees for representation of disabled people in the municipalities.

A qualitative content analysis of the national standards for the educational programs for the above mentioned educational groups is completed.

Results

UD courses / themes taught at university

Table 2 UD themes taught at university, reported by respondents. Legends used: 0 None, + a few (0-32% of respondents,) ++ some (33%-66%), many (67%+)

Theme	Architecture	Health Sciences	Social Sciences	Civil Engineering
Wheelchair turning circle	+++	+	+	++
Allergenic plants and trees	+	+	+	+
Visual impairment	+++	+++	+	++
Hearing impairment	+++	++	+	++
Cognitive impairment	+	++	+	++
Planning and Building Act	+++	++	++	+++
Technical regulations to the Planning and Building Act	++	+	+	+++
Zoning plans and regulatory provisions	++	+	++	++
Ramp design	+++	+	+	++
Colors and contrasts in buildings	++	++	+	++
Tactile surface paving/guiding lines	+++	+	+	++
The Usability Pyramid	+	+	+	+
The seven principles of universal design	++	+	+	++
The Universal Design Definition(s)	++	++	+++	++
UN Convention on the Rights of Persons with Disabilities (CRPD)	+	+	++	+
Other professionals' knowledge-base in UD	+	+	+	+
The Social Model of Disability	+	++	+	+
The Medical Model of Disability	+	+	+	+
The Relational Model of Disability	0	+	++	+
Gap-model of Disability	+	+	+	+
Using GIS-Analyses and/or Building Information Modeling (BIM)	+	+	+	+
UD strategies in general municipal plans	++	0	++	++

The results in Table 3 shows that Social Scientists seem to have little specialized education on UD themes, in their knowledge base from universities. Civil Engineers and Architects seem to have been taught some about the different groups of disabled, and about the relevant laws and regulations and UD measures. The Health Sciences category consists of several health professional groups, which

Table 3 Have you ever taught in classes with disabled students. Legends used: 0 None, + a few (0-32%,) ++ some (33%-66%), many (67%+)

Theme	Architecture	Health Sciences	Social Sciences	Civil Engineering
Students suffering from temporary reduced mobility	+++	+++	+++	+++
Mobility & Physical Disabled students (wheelchair users)	+	++	+	+
Students suffering from visual impairment or blindness	+	+	+	+
Students suffering from hearing loss or deafness	+	++	+	+
Students suffering from dyslexia	++	+++	+++	++
Students suffering from impaired self-reflection ability (Asperger)	+	+	+	+

Table 4 tells us that the educators within the health programs seem to have gained more experience with disabled students, than within other higher educational programs that is relevant for this study. This may probably remind these teachers about the importance of the UD, in their daily life.

Table 4 Experienced barriers to teaching about UD. Agreement to the assertion from the sample: 0 None, + a few (0-32%,) ++ some (33%-66%), many (67%+)

Theme	Architecture	Health Sciences	Social Sciences	Civil Engineering
There is no time-gap for teaching about UD in my courses	+	+	+	+
I lack competence/skills to teach UU	+	++	+	+
I do not know about suitable teaching materials for the UD	0	++	+	+
The Department Chair does not want us to teach UD	0	0	+	0
The Department cannot afford to hire people to teach about UD	+	0	+	+
Other subjects must be deleted if UD is to be included	+	+	+	++
UD is something students can learn when they get employed	0	0	0	0
UD should not be basic competence for our profession	0	+	++	+
UD is primarily the architect's responsibility	+	+	+	+

Surprisingly there are a large share of the respondents from the health sciences reporting they are lacking the competence to teach about UD. This may be explained by some diversity in how relevant UD seems to be as a knowledge base within health professions. While UD is regarded as a basic competence within the occupational therapist and the social educators study programs, the theme is rarely regarded as this among the educators for the nursing program, or the physiotherapist program. Still, a few respondents in each of the education categories above, claims that the main responsible for UD should be the architect profession. An argument for not implementing UD, is that if so then other themes must then be deleted from the educational programs.

Scheduled time for teaching UD and Curricula content

There is no significant differences between the respondent groups in teaching hours. The most frequent (median) level of teacher led education about UD is 4-8 hours, and 71 percent of respondents have answered they are using 8 hours or less to teach their students about UD. This means that many of the themes that are important in order to obtain a comprehensive competence in the field of the UD, are given little instructional time.

Universal Design is rarely mentioned specifically in the curricula for most of the educational programs studied. This may be a result of strict content requirements for professional knowledge in the framework plans for education, which provides little flexibility for new knowledge.

Concluding remarks

In view of the prerequisites laid down in laws and regulations of relevance for UD, there is a need to make some changes in the higher education curricula and knowledge base. One of the important issues then is that university lecturers acquire this knowledge and understanding, in order to teach effectively and collaboratively in this new domain.

Table 5 Knowledge levels varies between educational programs

Knowledge level	Base Knowledge	Concepts	Professions
Macro	Ethical concept, concept of human, human rights, UN-convention (CRPD), Local Master planning	Visions "where", change strategies "how"	Master Planners, Social Geographers, Public Health Professionals
Meso	Technical standards, design of services for elderly and disabled, implementation of plans and regulations. Knowledge of other professions knowledge base and cooperation.	Measures "how and what", Causes "why", Effects "Cost Benefit"	Architects, Landscape Architects, Civil Engineers, Town Planners
Micro	Individual experiences. Knowledge of how barriers occur and who experiences them	Causes "why", Effects "for whom", Measures "how"	Nurses, Social Educators, Physiotherapists, Occupational Therapists

There is a big difference between the overall level, which is mostly about ethics, values, strategies and understanding of rights, and the more concrete and technical intermediate level where UD may be understood as a threshold concept in accordance with standards, regulations and guidelines. For the micro level, it is often about degrees of perceived usability and accessibility. Our study (table 2) confirms that the different education programs focus on different levels. While social scientists and public health professionals are most focusing about the concepts at the top, architects, planners and civil engineers are operating at meso level, and at the micro level, we find most of the health professions knowledge base. However, there is a need

for interdisciplinary knowledge development something that requires awareness of each other's knowledge base (Lid, 2013).

There are some barriers to teaching UD in higher education, most frequently mentioned is the educators lack of knowledge, a lack of relevant teaching materials and an attitude that UD should not be the core competence for the educational programs.

It may seem that there is little compliance with the requirements for the implementation of UD in the community, and the national requirements for higher education learning content.

References

Budge, T. (2009). Educating planners, educating for planning or planning education: The never□ending story. *Australian Planner, 46*(1), 8-13. doi: 10.1080/07293682.2009.9995283

Dong, H. (2010). Strategies for teaching inclusive design. *Journal of Engineering Design, 21*(2-3), 237-251. doi:10.1080/09544820903262330

Heitmann, G. (2005). Challenges of Engineering Education and Curriculum Development in the Context of the Bologna Process. *European Journal of Engineering Education, 30*(4), 447-458. doi:10.1080/03043790500213136

Hitch, D., Larkin, H., Watchorn, V., & Ang, S. (2012). Community mobility in the context of universal design: Inter□professional collaboration and education. *Australian Occupational Therapy Journal, 59*(5), 375-383. doi:10.1111/j. 1440-1630.2011.00965.x

Imrie, R. (2000). Responding to the Design Needs of Disabled People. *Journal of Urban Design, 5*(2), 199-219. doi:10.1080/713683959

Karen P, I., & Bush, S. R. (2010). Educating students to cross boundaries between disciplines and cultures and between theory and practice. *International Journal of Sustainability in Higher Education, 11*(1), 19-35. doi: 10.1108/14676371011010020

Lid, I. M. (2013). *Universell utforming : verdigrunnlag, kunnskap og praksis*. Oslo: Cappelen Damm akademisk.

Rydningen, U., Norenberg, D. L., & Lid, I. M. (2016). Universell utforming som tema i høyere utdanning. *FORMakademisk, 9*(2). doi:10.7577/formakademisk.1330

The Center for Universal Design. (2008). About the Center; Ronald L. Mace. Retrieved from https://projects.ncsu.edu/design/cud/about_us/usronmace.htm

Turner, P., & Turner, S. (2011). Is stereotyping inevitable when designing with personas? *Design Studies, 32*(1), 30-44. doi:10.1016/j.destud.2010.06.002