Introducing Universal Design in Architectural Education

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Abstract. Architects have an important role in designing and creating buildings and outdoor environments for inclusion. Previously, the knowledge on accessibility in the architectural education has been focusing on the legislation regarding accessibility of public buildings and apartments buildings for special groups of people. The aspect of the user and the Universal Design thinking have been lacking in the education. Since 2015, in the Department of Architecture, Aalto University, Finland, a course on User Driven Space Design has been introduced. Each year approximately 15 master level students have been participating in the course. The course introduces knowledge on user-oriented space design through collaborative pedagogical methods and lectures. The assignment has been consisted of analyses of existing buildings, observation on site and identification of user groups of a specific building. Moreover, the task has been to evaluate how well the building design does enhances equal use of the premises. The students have been working in small multidisciplinary teams. As result, students participating in the course have become more sensitive about Universal Design, accessibility and user experience. They have learned by analysing, observing and experimenting themselves. The work in a small group challenges students to be more sensitive of the other person. The feedback of student has been very positive. Furthermore, they have self-reported the knowledge on Universal Design very useful in the architectural practice and expressed a need to get more education on the topic.

Keywords. Universal Design, architectural education, course design

1. Introduction

This paper describes a course on user-oriented space design offered to master level students in the Department of Architecture in Aalto University, Finland. The course is related to the research activities carried out in the Research Institute for Health Care Facilities, Sotera. Traditionally, in architectural education, the teaching has been focusing on the accessibility legislation and, for example, dimensions of wheel-chair accessible toilets and low threshold entrances. The aspect of the user and the Universal Design (UD) approach have been lacking in the education. As result, accessibility has a negative association to design outcome among many architects. Van der Linden, Dong and Heylighen observed in their study that most architects considered UD as a legislative matter regarding accessibility for specific groups of people [1]. However, Bordas pointed out that following rules and regulations on accessibility without understanding the user's needs may generate unsuccessful result. She argues that

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empathy is the most important factor for obtaining inclusive design solutions, instead of producing segregation by providing special solutions for persons with disabilities [2]. Furthermore, Denizou claim that UD emphasizes solutions that are better adapted to the context and more responsive to the needs of the users than results from standard design process [3].

It is important to give students in architecture a more comprehensive view of the design task, taking into account a range of people using the space. Furthermore, it is important to identify various stakeholders using the built environment. The goal of the course is to identify various user groups and to deepen the understanding of the users' needs. The overall aim is to raise awareness of the UD among students, to encourage design that focus on the quality of user-experience.

Bandura argues that learning is a social action, which occurs in contact with other people [4]. Therefore, the teamwork has been used as a tool to enhance interaction between students. Students learn from interaction with each other. The theories of social and situated learning argue that learning happens constantly in our daily life. Therefore, it is important also to take the students out of classroom to their everyday environment. Moon urge the importance to develop student's own reflection in order to deepen their understanding [5]. Therefore, the students are encourage to make observations, analyse the results and to use critical thinking.

2. Background

The basic school education promotes inclusive teaching and takes into account the variety of children and their abilities. Likewise, the universities need to better adapt to students with different competencies and various cultural backgrounds. Some university students may have learning difficulties or dyslexia. In Finland, 5 percent of students in higher education are estimated to have challenges in reading or writing [6]. The physical environment has a role in teaching and learning. It can enhance both inclusion and the learning outcomes. Therefore, the Aalto University has been taking actions to promote accessibility of the premises. After renovation of the Undergraduate Centre in 2015, the university received the Accessible Finland Award (Esteetön Suomi –palkinto) [7]. Furthermore, in June 2017, the Aalto University Board approved the Code of Conduct to promote equality.

"Every member of the Aalto community has the right to be treated with respect regardless of their gender, gender identity or expression thereof, age, ethnic or national origin, nationality, language, religion, beliefs, opinion, political or trade union engagement, family relations, health, disability, sexual orientation, or other personal characteristics." [8]

According to Finnish Universities Act, the mission of the universities is to provide research-based higher education and to educate students to serve their country and humanity at large [9]. Raising awareness among students and sharing the values of non-discrimination and equality are important tasks of the universities. Therefore, the inclusive approach should be present in the course contents and objectives. The course *Basics of user driven space design* has been developed in the department of architecture to sensitise students to diversity of user profiles. Since 2015, students in architecture and since 2017 students in other disciplines in the university have possibility to enrol in the course.

The architects, designers and engineers have a big role in creating equal opportunities in the society. At its best, the built environment can enhance inclusion. At its worse, it can exclude one part of the society. The UD is a process for creating a sustainable society as it has both economic and social impacts [10]. In the recent years, the push in architectural studies has been towards eco-friendly solutions and energy efficiency. The social sustainability and inclusive design has received less attention in the debate concerning built environment. However, today it is generally recognised that the benefits of accessibility and UD are not limited to a small number of people with physical or sensory disabilities. Due to population aging, there will be a large proportion of older persons living with mobility and sensory limitations in our cities. It is not a sustainable or economic way to create specific living environments for older people, who represent one fourth of the population. Therefore, we need to anticipate the demographic development, teach students a user driven approach and take UD principles into account in all our future design work.

In Finland, most master level students in architecture have work experience in architectural design. During their final studies, they need to find their own interest fields and their architectural expression. The Basics of user driven space design course is an optional course, and most students enrolled in the course are interested in the topic. The teacher's role is to support students own strengths and help them find relevant and accurate information on the topic of their interest. Moreover, it is important to use trustworthy resources. The role of the teacher is also to teach students to observe critically, and to be analytic of their observations.

3. Teaching Method

The approach to teaching in the course of Basics of user driven space design is quite practical. Bandura argue that learning is the result of direct observation as well as affective experiences of other people [4]. Experiencing and evaluating the existing spaces and observation on site is useful for the student's future design work. Social and situated learning theories enhance the opportunity to apply learning from the real world [11]. Furthermore, Acton pointed out, that learning spaces transform pedagogic practice and enhance student experience [12]. Therefore, it is important to leave the traditional classroom and use the everyday environment as learning environment. During the course, the theories of social and situated learning are applied by visiting existing spaces with students, observing and evaluating the use of the spaces together. The students own knowledge and user experience of the space make learning easier and more motivating. Therefore, they are given practical observation tasks from their daily living environment, university campus, shopping centre etc. The task is to analyse the usability and accessibility of the chosen space from a new perspective. Moreover, students are asked to report points of discontinuity and obstacles in the built environment. The descriptive reflection opens their eyes and helps them to deepen their understanding on the UD.

Prior to the visits and the group assignment, the students are given information on the topics of UD, user experience and accessibility. Moreover, they may have lectures by Experts by Experience. Experts by Experience are people who have personal experience on a physical or sensory impairment. Furthermore, the students have the possibility to try a wheelchair or vision impairment simulators in a safe environment, in the university campus.

The aim is to create a safe learning environment for multidisciplinary groups. The observation task in a small group encourage discussions between students and they may get to know each other. Tucker and Abbasi argue that the teamwork is representative of the practice of design work [13]. Therefore, learning in a multidisciplinary group is also beneficial for the students in their future professional life. The assignment has been done in pairs or in small groups of three persons, and each student participates in presenting the work during the final evaluation.

4. Results

In the master level courses, the teacher's task is to facilitate the exchange of views and support the design work. The discussion aims at developing critical thinking and deepen understanding [14]. Since 2015, the number of students enrolled on the course has increased from 15 (2015) to 24 (2018). Since 2017, students also from other departments of the university have been able to enrol in the course. This allows to form teams with participants coming from different disciplines. The students have been able to choose freely the mode of submitting their analytical observations: photos, drawings, videos, etc. The assignment includes a general description of a space visited and identification of various user groups. Moreover, assessment of the user friendliness and accessibility, as well as possible design solutions for improvements are requested. The group assignment is presented and evaluated during the course. The students get peer feedback from other students as well as comments of the teacher.

During the first course in 2015, the assignments was to assess the path between home (or a hobby) and the university campus. One student was taking the path and was self-reporting his or hers experiences while the other one was observing and making notes. The observing student had to describe the path from start to destination, and reflect the user experience. Furthermore, the students had to find together and make a description of any possible points of discontinuity on the path. Moreover, they were asked to discuss solutions to improve the user experience on the path. All students were using public transportation or bicycles to arrive at the campus. In all cases, one part of the path was done walking. Therefore, the student's observation was related to user experience and access to public transportation and bus stops (Fig. 1).

"There is no shelter in the bus stop.
It is windy, luckily not rainy."
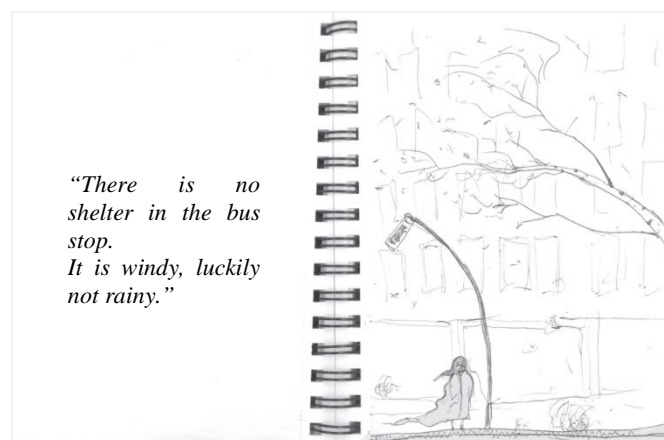
Fig. 1. Lack of sheltered bus stop made the trip uncomfortable. (Students in architecture Kotilainen, M. & Müller, E.)

Moreover, improvements on walking and biking paths on the campus were proposed as well as better separation of pedestrian traffic from bicycle lanes (Fig. 2). Other identified problems were, for example, discontinuity of bicycle lanes, inadequate guidance as well as general perception of the path.

Fig. 2. Improvements of walking paths in the university campus. (Students in architecture Palomäki, J. & Sederholm, A.)

In 2018, the students were asked first to observe the university facilities through the point of view of a visitor, a teacher, or a member of cleaning staff. They were assessing the facilities in small groups of three to four persons. Students found, for example, that heavy doors, uneven surfaces and unpractical furniture were hindering the work of the cleaning personnel. They were pointing out that wayfinding and accurate information on classrooms are important for visitors, students and teaching staff members. However, the information was sometimes confusing or missing (Fig. 3). Moreover, they found that lack of pedestrian crossings near the department building made the route unsafe and the main entrance was not easy to identify.

Fig. 3. The spatial variation, recognizable objects (landmarks) and information on the walls would help in wayfinding (Students Kouhia, H. & Palmu, S.)

Furthermore, students were visiting the premises of Kamppi centre, in the centre of Helsinki city with the teacher. The centre includes commercial services, bus station as well as a metro station. The Kamppi centre has been realised taking especially persons with visual disability into account in the design. Tactile paving and sound beams are used to enhance navigation, for example. However, the challenge is to manage a of large amount of various kinds of information: information on services, bus timetables and publicity (Fig. 4). The students in multidisciplinary groups were analysing the premises. In one of the groups, a student in architecture was observing the accessibility of spaces and wayfinding, whereas a student in computer sciences was observing the guidance system and access to information, for example. The hierarchy of the information was reported to be the main problem (Fig. 5).

Fig. 4. The amount of information is confusing in a station area. (Students Jolkkonen, J. & Joevee, J.)

Fig. 5. The information stands lack clarity in design and people mistaken them for publicity (Students Jolkkonen, J. & Joevee, J.)

Some students were already familiar with basic accessibility issues, but all of them were surprised of the number of unsuccessful solutions. Furthermore, they pointed out that many of these solutions would be relatively easy to solve by good design. They learned by analysing, observing other users and experimenting themselves. The work in pairs or in small groups challenged students to get a broader point of view.

5. Discussion

During the course, the students were observing their familiar environment with a new perspective. They found many challenges in the design of built environment and became more sensitive to user experience and to UD. The feedback of the student has been very positive. Moreover, they self-reported the knowledge on UD to be very useful in the architectural practice and expressed the need to get more education on the topic.

A method called *I like - I wish*[2] was used to get feedback from the students regarding both the course content and the group work. It is a tool for facilitated team feedback activity. The students were asked to self-report things they liked in the course or in the group work and things, they wished to improve. The students *liked*, for example, to hear the Experts by Experience, try the assistive devices and do observation on site. However, they *wished* a more critical observation of the recently realised buildings by the teacher. Moreover, some students complained not being able to follow the discussion during the visit to the Kamppi centre because of the noisy environment. This is a challenge for organising the site visits as well as for UD. In the future, some hand out material will be given to the students before the site visit and observation task. Information given in various forms is important also for teaching practice. This would help all students to follow the teaching. Moreover, the students own experience and reflection enables to assimilate critical observation to become aware of challenges of the existing facilities.

The group work may take more time and effort than an individual assignment. Therefore, some students *wished* a personal assignment instead of group work. The students may perceive the individual task easier to accomplish. However, the group work enhance their learning, discussion and critical thinking. It would be beneficial to discuss more with students about the role and importance of group work in their learning and in their professional life. Further, the teaching of group work skills should be added in the course design. Tucker and Abbasi identified this an important factor for satisfaction of teamwork outcomes [13]. Moreover, the constructive alignment of the course helps to clarify the learning outcomes and evaluation criteria for the students [15]. In particular, in the group work, indication of expected outcomes and workload enable the students to better develop their curriculum, plan their schedule and achieve the credits required.

The clear indication of teaching and learning outcomes helps, in the end of the course, to evaluate the assignments. The fare evaluation of group work is important even though, it may be challenging. The personal output and workload of a student within a group may vary. Black, Weinberg and Brodwin have adapted the UD principles to education [16]. They point out the importance of communication with

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[2] *https://ilikeiwish.org/*

students and between the students as well as creating a welcoming and inclusive climate. Moreover, they emphasise the need to eliminate unnecessary complexity and offer a choice of methods. Interdisciplinary team work make courses interesting for the students as well as for the teacher. Lectures from teacher of other disciplines as well as Experts by Experience give a wider perspective of the given assignment.

I hope that my research background on UD and accessibility in built environment has a positive effect on the teaching as well. As a teacher, I would like to learn more about flexible and intuitive ways of teaching and learning and apply them in my work. Moreover, good knowledge of teaching and learning methods enables to be more flexible and to improvise in order to choose the best methods for each particular group of students. The pedagogical knowledge increase the teacher's confidence of his or hers own skills as a teacher.

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