# The Concepts of Accessibility and Equality in Design Education: The Universal Design Approach

**Güliz MUĞAN AKINCI**

## Abstract

Universal design approach aims to design products and environments that provide equal access for everyone to the variety of activities. Universal design applications and research and discussions related to these applications can be seen in different fields very often especially in the last years. Concerning the fact that its possibility of application is very new in Turkey, on the one hand, one of the aims of this study is to introduce and explain this new approach. On the other hand, the study aims to exemplify how the new information related to the philosophy of universal design approach can be integrated to the design education and find the ways of application in the university environment where the next expert generation has been coached. Within this framework, it

*Güliz MUĞAN AKINCI*,
Assist. Prof. Dr.
Okan University, Department of Interior Design, Istanbul, Turkey
E-mail: guliz.mugan@okan.edu.tr

is aimed to introduce the content and the way of application of the course of "Universal Design" which have been taught in the curriculum of the Architecture and Interior Architecture Departments of Okan University. Within the scope of the course, the students are expected to investigate and analyze the reflections of seven principles of universal design in real-life settings for the different and varied groups of human beings. While integrating the universal design approach to the design education, the things that is wanted to be emphasized is, this new and different approach is an inspiring fact for the new generation of designers concerning the concepts of accessibility and equality. The designs, organizations, suggestions, studies and researches of the design students of the course has demonstrated that if the universal design principles has become a component of the design education, it would also be achieving as a rewarding and fostering attempt.

## INTRODUCTION

At the beginning of the 20th century older people, people with chronic illnesses and disabled people were accepted as the major minority group in the society due to the fact that only a very small amount of people among these group could have chance of survival and continue living with disabilities. The average human life span was 47 and people with spinal cord injuries had only a 10% chance of survival (Story, Mueller & Mace, 1998). However, today, through antibiotics and other medical advances as well as improvements in sanitary and hygienic conditions, deaths due to some accidents and illnesses has been rapidly disappeared. Accordingly, people has started to live longer and this resulted in a population which is older and more disabled and these trends seem to be continuing (Ergenoğlu & Yıldız, 2009; Jones & Sanford 1996).

Unlike what the most people are assuming, being disabled represents a more common and prevalent condition. The all healthy individuals should be aware of the fact that there is always a possibility of encountering an illness or an accident that result in a disability condition (Hacıhasanoğlu, 2003). Besides, it is very likely that everyone has experienced disability, even if temporarily, in his or her lifetime. Simply, using a cane, crutches or walkers during older ages due to the natural reasons of aging can be given as an example of the inevitable disability condition. Moreover, when wearing corrective lenses or eyeglasses, still having difficulty in reading some words or letters in magazines or newspapers might also be another example of a common everyday disability for most of the people. While some people have chronic disabilities, others might have temporary disabilities (Robinett, 1985; Story, Mueller & Mace, 1998). A broken leg, the flu or the lasting effects of a loud concert are the examples of temporarily disabling conditions. Apart from these some environmental and personal factors might also lead to

55

some temporary disabilities. For instance, poor lighting, changing weather conditions, carrying packages, wearing bad shoes, being a foreigner or even being pregnant might affect people's physical, sensory and cognitive abilities (Story, Mueller & Mace, 1998). Furthermore, deficiencies in urban planning, disorganization in urban and architectural design as well as lack of consciousness regarding these issues prevent citizens to reach necessary awareness level concerning the issue of disability in cities.

Designers are mostly trained to make designs for an "average" group of people. However, the idea of making design for the average group of people is a biased understanding, which involves discrimination and stigmatization against certain group of individuals in the society. Yet, every individual is unique and there are diverse group of individuals in the society. Story, Mueller & Mace (1998, p.2) argues that:

> It is possible to design a product or an environment to suit a broad range of users, including children, older adults, people with disabilities, people of atypical size or shape, people who are ill or injured, and people inconvenienced by circumstance. This approach is known as universal design … [which] can be defined as the design of products and environments to be usable to the greatest extent possible by people of all ages and abilities.

Especially within last years, universal design applications and researches regarding its fields of applications have gained acceptance and become widespread in the everyday life (see Center for Universal Design 2013, Hacıhasanoğlu 2003, Olguntürk & Demirkan 2009). Therefore, it is significant to give emphasis to this new approach of design.

Universal design, by respecting human diversity regardless of people's sizes, shapes and abilities, aims to promote inclusion, accessibility and equality in use and involve all these concepts into the every field of life. As Cavington and Hannah (1997) pointed out, the main goal for the universal design approach is to make everything to be accessible by everybody under any circumstances. Accordingly, by avoiding a certain type of individual such as disabled or not, female or male, young or older, it is aimed to suggest one and only design solution for everybody (Hacıhasanoğlu 2003).

The universal design approach is growing everyday though changing standards, design experiences and marketing abilities. In this framework, the aim of this study, on the one hand, is to explain and describe the universal design approach which has found the possibility of application very recently in Turkey. On the other hand, it is proposed to exemplify the way

how the information that is based on the philosophy of universal design can be integrated to the curriculum of design education and find a field of application in universities, which are the centers that train and guide the next generation of experts. Within this framework, this paper intends to introduce the content and the way of application of the course of "Universal Design" which have been taught in the curriculum of the Architecture and Interior Architecture Departments of Okan University.

## UNIVERSAL DESIGN AND ITS PRACTICABILITY

The term "universal design" was firstly used in 1989 by Ron Mace in US, in order to describe a design approach which aims to bring together the products and environments that are accessible by everyone. In that sense, in 1989, the Center for Accessible Housing was founded under a grant from the National Institute on Disability and Rehabilitation Research (NIDRR), under the guidance of Ron Mace. It was developed as an information resource with a mission to improve the quality and availability of housing for people with disabilities and aging. In 1994, the Center for Accessible Housing received a second grant from the National Institute on Disability and Rehabilitation Research (NIDRR) to expand the mission of the Center to develop new approaches for the promotion of accessible housing, including innovative, financial and management models, as well as the field of design, where principles for universal design were investigated.

In 1996, by gaining a more institutionalized structure, Center for Accessible Housing changed its name to The Center for Universal Design and this helped to reflect the broader scope of the Center across the whole built environment. In 1997, a group of 10 experts including, architects, product designers, engineers and environment researchers, published the seven principles and related guidelines of universal design (Center for Universal Design, 2013).

Of course as it is mentioned by Story, Mueller and Mace (1998), it is not reasonable and realistic to expect that products and environments could ever be used by everyone under all conditions. Therefore, universal design as an approach is simple to grasp in theory but difficult to apply in practice. A designer should know that it needs certain amount of time to include the principles of universal design to the process of design in general; for this reason it is significant to consider universal design as a process rather than a design outcome. The seven principles of universal design were formulated in order to answer the diverse needs of diverse group of people as well as the requirements of different design disciplines. Moreover, these principles could be

57

used as guide in evaluation of existing designs, design process
and educate designers and consumers about the future of more
accessible and usable products and environments.

**UNIVERSAL DESIGN PRINCIPLES**
　　　　The seven principles of universal design are developed to
make the approach to be applicable in not only different fields of
design such as architecture, product design or urban design, but
also to be realized in public services such as health,
transportation, communication and educations systems (Erkılıç,
2011).
　　　　Universal design principles and guidelines, which are
developed to make a better understanding of the principles in
the process of application, can be explained as follows (see
Erkılıç, 2011; Story, Mueller & Mace, 1998). Besides,
photographs are used to demonstrate the example of each
principle:

Principle 1: Equitable Use
The design is useful and marketable to people with diverse
abilities.
GUIDELINES

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



**Figure 1.**

**Figure 1.** Provide the same means of
use for all users.
*Source: mile.mmu.edu.my*

## Principle 2: Flexibility in Use
The design accommodates a wide range of individual preferences and abilities.

GUIDELINES
- 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

**Figure 2.** Provide choice in methods of use.
*Source:*
*www.21stcenturybuildingcompany.com*



**Figure 2**.

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

GUIDELINES
- 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

**Figure 3.** Eliminate unnecessary complexity.
So*urce: www.niu.edu*



**Figure 3**.

59

## Principle 4: Perceptible Information

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

GUIDELINES

- Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information
- Provide adequate contrast between essential information and its surroundings
- Maximize "legibility" of essential information
- Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions)
- Provide compatibility with a variety of techniques or devices used by people with sensory limitations
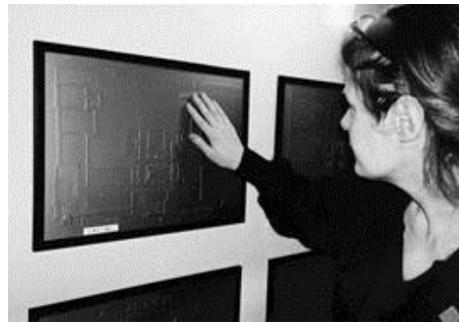


**Figure 4a.** Use different modes.
*Source: www.pinterest.com*

**Figure 4b**. Maximize "legibility"
*Source:www.artbeyondsight.org*

**Figure 4a.**           **Figure 4b**.

## Principle 5: Tolerance for Error

The design minimizes hazards and the adverse consequences of accidental or unintended actions.

GUIDELINES

- 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 in tasks that require vigilance
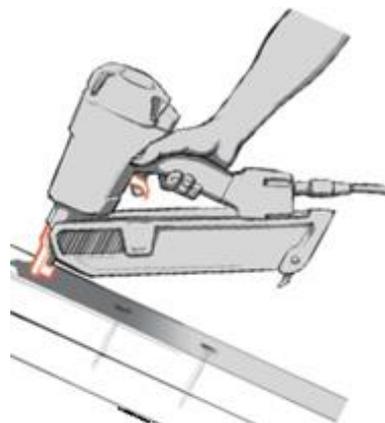


**Figure 5.** Provide fail safe features.
*Source: www.extension.org*

**Figure 5.**

## Principle 6: Low Physical Effort

The design can be used efficiently and comfortably and with a minimum of fatigue.

GUIDELINES

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

**Figure 6.** Allow user to maintain a neutral body position.
*Source: www.udll.com*



**Figure 6.**

## Principle 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, or mobility.

GUIDELINES

- 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

**Figure 7.** Make reach to all components comfortable for any seated or standing user.
*Source: mile.mmu.edu.my*



**Figure 7.**

61

## UNIVERSAL DESIGN APPROACH IN DESIGN EDUCATION

Within the scope of universal design approach, it is significant to embrace it as a philosophy for diversity of human population and built environments that should involve different dimensions including health, functionality, comprehensibility and aesthetic. By human diversity, the categories of size, body functions, hearing and speech, cognition and perception should be highlighted and the designs that respect these diversities can be said to be considered as the essence of the universal design. Within this scope, the use of universal design approach for built environments provide different opportunities, not only for different groups of users, but also for the design market through its alternative point of views for the designers

As it is underlined by Ostroff (2010), today, the universal design paradigm has been evolving in a sense that it finds a place in the programs and service areas of different sectors such as business world and education as well as design sector. Accordingly, it becomes much more significant to provide its permanence through institutions that give the education of universal design and successors of the approach.

Universities which include programs that give design-based educations for the next generation of experts, have to ensure that the knowledge they impart is based on this philosophy. In addition to this, design studies should continue along this line of thinking. Within this framework, in this study, it is possible to exemplify the content and the way of application of the course of "Universal Design" which have been taught in the curriculum of the Architecture and Interior Architecture Departments of Okan University since 2010 Fall Semester.

## AN EXAMPLE OF "UNIVERSAL DESIGN" COURSE CONTENT AND THE WAY OF APPLICATION

From 2010 onward, Engineering-Architecture and Fine Arts Faculties of Okan University, by being aware of the fact that, in recent years, universal design has the potential of designing different products and environments for different sectors including automotive, clothing, information technologies and housing has included the course of "universal design" to the curriculum of the Architecture and Interior Architecture Departments, which are closely following the innovations in the sectors in order to train new generation of designers. While organizing the content of the course, it was aimed to construct a totally new framework compared to other studio and theoretical courses where the concept of universal design has only been introduced as one of the subtitles of the course. However, with this course, it was planned to bring together the theory and application in order to fulfill the overall philosophy of the

universal design approach. Hence, students were expected to get the chance of application and analysis within a real life setting immediately after what is taught through theory in the classroom which was considered to be the major difference and benefit of the course compared to other design courses in architectural and interior design education. Therefore, it was planned to make students consider that the best way to understand the universal design approach was not only through theoretical principles but also to experience it as a part of the everyday life.

Within the scope of the course, firstly, design students are expected to embrace the universal design as a philosophy, which has its own systematic way of thinking, in designing products and environments. In this context, as a starting point, human diversity and the capacity of human abilities are described and emphasized. Instead of making design for an "average" group of people, through the emphasis on the diversity of human body and abilities, the potential of designing for different group of individuals are discussed. Accordingly, students are required to spend time with different groups of individuals having the power of representation in terms of diverseness, including the individuals who have bodily, cognitively and socially different abilities. For every week, students are expected to make observations and analyses regarding the way environmental factors affected different groups and how different groups of individuals are interacted with the environmental factors. Moreover, students are also required to investigate the positive and negative examples of everyday encounters within the built environments and through the use of products that can be discussed around the principles of universal design. Hence, it is aimed to make students grasp the design problems and reanalyze them in terms of the expectations and needs of different groups of individuals about the places and products which are used number of times in everyday life.

The term project of the students is to investigate and analyze the Okan University Tuzla Campus within the framework of universal design philosophy and principles. Besides, they are also expected to bring out suggestions and solutions in order to reorganize the Campus in accordance with the understanding of the universal design.

First of all, they have been given a problem definition together with design scenario, according to which an X person starting from dormitory building follows a certain route, use some facilities in the campus and then leave the campus through a bus. During this little trip, this X person uses some Faculty buildings, the social center, (including the stationary and library), ATM, cafeteria and bus stop. Secondly, according to these facilities and buildings Campus area has been divided into

63

4 zones of which have equal number of facilities and building that needs to be evaluated. Then, students have been organized into teams and each team are addressed to be responsible for evaluating, analyzing and investigating one zone in accordance with the universal design principles. While doing this, project teams are recommended to follow the below mentioned road map in order to complete the project:

1- Each group should draw a site plan of the campus highlighting the parts and buildings in the zone that they are responsible for.
2- For each zone, facilities, items, buildings etc. which will be analyzed, should be listed one by one.
3- According to the 7 principles of universal design, paths, facilities, entrances, exits, public amenities etc. should be evaluated through control lists by indicating the signs **positive (+), negative (-) or not applicable (N/A)**.
4- Following each control list, an evaluation part will be involved which explains the facilities which are evaluated as negative and not appropriate according to universal design principles.
5- Each negative facility and problems concerning the zone should be photographed and added to the report.
6- Regarding the problematic facilities some universal design solutions should be suggested. While doing this some previous studies, some designed products and spaces and related design standards should be used as references.

When the projects of the students are analyzed, it has been determined that students, who work as teams, have investigated the universal design principles and their design reflections in the campus within the framework of 4 criteria by focusing on the concepts of accessibility and equality. These 4 criteria can be listed as follows:

- Entrances and exits
- Using circulation systems (paths, stairs)
- Wayfinding and signalization
- Public amenities (restrooms, ATM, bus stop)

The students' suggestions and regulations concerning the accessibility and equality in use of the campus environments have also been observed to be realized around these 4 criteria. At the below, you can find some images from the team projects of the students which indicates the way they analyze the campus environment in a systematic way by following the road map that was defined at the beginning of the semester as it was mentioned above.

**Figure 8.** The control list about a path in one of the zones
*Source:* One of the projects of the students (Gülçin Çelik, N. Gül Çelebi, Umut U. Polat, Esra Özçağlar) of ARCH 280 Universal Design Course.



**Figure 8.**

**Figure 9.** The control list about the accessibility of an elevator in one of the zones.
*Source:* One of the projects of the students (Veysel Can Oto, Caner Yılmaz) of ARCH 280 Universal Design Course.



**Figure 9.**

**Figure 10.** The evaluations and suggestions of the students regarding problematic facilities about signalization, way finding and use of public amenities.
*Source:* One of the projects of the students (Emirhan Varışlı, Enes S. Uçar, M. Ozan Erdem) of ARCH 280 Universal Design Course.



**Figure 10.**
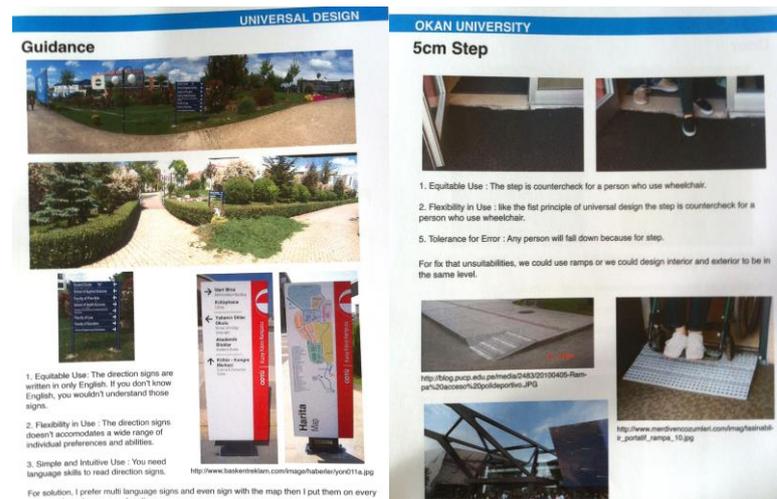
**Figure 11.**

Figure 11. The map of the zone, evaluations and suggestions of the students regarding problematic facilities about signalization, wayfinding, use of public amenities and circulation systems.
*Source:* One of the projects of the students (Gülçin Çelik, N. Gül Çelebi, Umut U. Polat, Esra Özçağlar) of ARCH 280 Universal Design Course.

## CONCLUSION

Universal design approach involves the design of the products and environments which are aimed to be equally accessed by large masses as much as possible (Ergenoğlu ve Yıldız, 2009). While the researches have been conducted for universal design, consumer products, construction elements and architectural spaces are evaluated and performance characteristics, which can be usable and accessible by diverse groups of individuals, are determined. Universities, as being one of the crucial social, educational, and scientific environments of a built city, might be an appropriate site for the application of Universal Design. For that reason, it can easily be assumed that diversity of university environment is beneficial to analyze how Universal Design works. Moreover, for the prevalence of universal design approach in the field of design application, it is significant to integrate this philosophy to the programs that give any kind of design training. Today, it is possible to observe the involvement of universal design approach directly to the process of design by variety of educational institutions through different strategies such as including principles of universal design to the studio courses and forging the awareness of students in terms of their thinking process (Demirkan, 2011). Recently, in Turkey, the number of researches and applications about the way that universal design has been integrated to the design education and its after-effects to the process of design has been increasing (see Olguntürk & Demirkan, 2009).

In this framework, the "universal design" course that is given in Architecture and Interior Architecture Departments and from this year onward in Industrial Design Department, aims to provide a different level of awareness in design education; and hence, tries to constitute a new point of view for the existing designs and guide the design process. What should be emphasized through the integration of universal design to the design education, is to make new generation of designers be aware of the fact that universal design is not a barrier for a better design, but instead an inspiring component. The projects of the students, their designs, suggestions and researches have demonstrated that if the universal design has been dissolved in the design training and be a real part of it, it is an attempt that can be achieved, inciting and rewarding. Furthermore, the attempts in organizing the campus environment of Okan University according to the concepts of accessibility and adoptability through different design implementations lead to sometimes positive applications in the setting, but sometimes applications that need improvements. Nevertheless, all these efforts and attempts turn the whole campus environment to a real life setting in which design students can experience and

67

learn the way that they can apply the principles of universal
design and its philosophy in the diversity of an everyday life
environment.

**REFERENCES**

Cavington, G. & Hannah, B. (1997). *Access by Design*. New York:
Van Nostrand Reinhold.

Center for Universal Design. (29 April 2013).<
http://www.ncsu.edu/project/design-projects/udi/>.

Demirkan, H. (2011). "Tasarım Eğitiminde Herkes için Tasarım
Yaklaşımı: Tasarım Deneyimleri ve Uygulamaları". *Herkes
için Tasarım Müfredatı Geliştirme Çalıştayı*, Anadolu
Üniversitesi, Eskişehir, 16-17 Haziran.

Ergenoğlu, A. ve Yıldız, S. (2009). "Fiziksel Çevre ve Ulaşıma
Erişilebilirlik" *Farklı Açılardan Engellilik Projesi-Çalışma
Grubu*. Sabancı Üniversitesi.

Erkılıç, M. (2011). "Conceptual Challenges between Universal
Design and Disability in Relation to the Body,
Impairment and the Environment: Where Does the
Issue of Disability Stand in the Philosophy of UD?"
*METU JFA*, 28(2), pp. 181-203.

Hacıhasanoğlu, I. (2003). "Evrensel Tasarım". *Tasarım Kuram*, 3,
pp.93-101.

Jones, M. & Sanford, J. (1996). "People with mobility impairments
in US today and in 2010". *Assistive Technology*, 8.1,
pp.43-53.

Olguntürk, N. & Demirkan, H. (2009). "Ergonomics and universal
design in interior architecture education". *METU JFA*,
26(2), pp.123-138.

Ostroff, E. (2010). "Universal Design: An Evolving Paradigm"<
http://www.mhprofessional.com/downloads/products
/0071629238/0071629238Pdf. >. 09 Temmuz 2013.

Robinett, M. (1985). *Barrier Free Exterior Design: Anyone can Go
Anywhere*. New York: Van Nostrand Reinhold.

Story, M. F., Mueller, J. L., & Mace, R. L. (1998). *The Universal
Design File*. NC State University: The Center for
Universal Design.

**RESUME**

Dr. Güliz MUĞAN AKINCI obtained her B.S. degree from
the Sociology Department of Middle East Technical University.
Then, she got her Master's and Ph.D. Degree from the field of
Environmental Psychology in Interior Architecture and
Environment Design Department of Bilkent University. In 2009,
she completed her post-doctoral study within the scope of a
European Union supported international project. She's been
working as an instructor in Interior Architecture Department of

Güliz MUĞAN AKINCI

Okan University since 2010. At the same time she's been working as the Vice Dean of Fine Arts Faculty of the university. She has papers and books on youth behaviours in urban public spaces including shopping malls and streets, the universal design approach, time use studies and the effects of mobile phone use and survelliance technologies on urban spaces.

69