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DEVELOPING AWARENESS TOWARDS INCLUSIVE DESIGN WITH EMPATHIC MODELING: A CASE STUDY IN A CAMPUS ENVIRONMENT

EMPATİK MODELLEME İLE KAPSAYICI TASARIMA YÖNELİK FARKINDALIK GELİŞTİRME: KAMPÜS ORTAMINDA BİR VAKA ÇALIŞMASI

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ABSTRACT
The design of the built environment is very crucial since it can have an impact on the engagement and participation of people in their everyday activities. Often there is a mismatch between the users and the built environment that causes barriers to access and use. Designers need to be aware that users of the built environment can have diverse abilities and needs. This study aimed to develop awareness towards inclusive design during an experimental inclusive design course taught at the Interior Architecture department of a private university in Ankara, Turkey. Thirty students enrolled in the course experienced the university campus by empathic modeling and described their experiences and difficulties as being visually impaired. A questionnaire was administered to identify the barriers in the campus environment from the perspective of a visually impaired user. Empathic modeling was shown to be important to support inclusive design and allowed students to develop awareness to inclusion of people with different abilities. Therefore, inclusive design has to be emphasized as a fundamental and inseparable aspect of the design education.

Keywords: Built Environment, Empathic Modeling, Inclusive Design, User Experience, Vision Impairment

ÖZET
Yapılı çevrenin tasarımı, insanların günlük faaliyetlerine katılımı üzerinde etkisi olabileceğinden çok önemlidir. Çoğunlukla, kullanıcılar ile yapılı çevre arasında erişim ve kullanım engellerine neden olan bir uyumsuzluk vardır. Tasarımcıların, yapılı çevrenin kullanıcılarının çeşitli yetenek ve ihtiyaçlara sahip olabileceğinin farkında olmaları, bu uyumsuzluğu gidermek için büyük önem taşımaktadır. Bu çalışma, Ankara'da özel bir üniversitenin İç Mimarlık bölümünde verilen deneysel bir seçmeli tasarım dersi sırasında kapsayıcı tasarıma yönelik farkındalık geliştirmeyi amaçlamaktadır. Çalışma kapsamında, derse kayıtlı otuz öğrencinin, üniversite kampüsünü görme engelli birey rolüne girerek empatik modelleme ile deneyimlemesi ve deneyimlerini tanımlaması yöntem olarak kullanılmıştır. Görme engelli bir kullanıcı açısından kampüs ortamındaki engelleri belirlemek için anket çalışması yapılmıştır. Bu çalışma ile empatik modellemenin kapsayıcı tasarımı desteklemek için önemli olduğu ve öğrencilerin farklı özelliklere ve engellere sahip insanların dâhil edilmesine yönelik farkındalık geliştirmelerine izin verdiği gösterilmektedir. Bu nedenle, kapsayıcı tasarımın, tasarım eğitiminin temel ve ayrılmaz bir parçası olarak içerilmesi ve eğitim sürecine entegre edilmesini gerektiğini vurgulamaktadır.
Anahtar kelimeler: Yapılı Çevre, Empatik Modelleme, Kapsayıcı Tasarım, Kullanıcı Deneyimi, Görme Bozukluğu

1. INTRODUCTION

The built environment that can have impact on the participation and engagement of people in their everyday activities is very crucial since it can enhance the people's quality of life. As a result, design professionals play an important role in the design of built environments since the design can either ease or obstruct an individual's ability to participate and interact in the built environment (Hitch, Dell & Larkin, 2016). Designers need to be aware that people can have diverse abilities and needs when designing physical spaces. When the users of the built environment are different from the designer with different abilities and needs, there is often a mismatch between the users and the built environment that causes barriers to access and use (Altay et al., 2016). An accessible design accommodates the needs of diverse user groups in different situations and under various circumstances (Marshall et al., 2004). However, physical and social isolation may result from the inaccessibility of the environment (Altay, 2017).

In order to create accessible built environments, designers need to adapt new attitudes towards the design process. Designers need to acknowledge, observe and understand people with a variety of abilities and needs in which a user-centered approach is necessary (Altay, 2017). With the user-centered approach inclusive design, universal design or design-for-all concepts can be integrated. These concepts all intend to design environments/spaces and products in which all people are able to use and access without the need for help, adaptation or change in design (The Center for Universal Design, 1997). As a result, designers need to place users at the center of the design process and establish empathy with the diverse users who vary in age, sex and capability, so that they can understand the built environment from the user's perspective (Strickfaden & Deoliger, 2011).

It is necessary to encourage the understanding of social and physical inclusion of people by students, different from them with different abilities. This study focuses on the experiences of students through empathic modeling during a course in the department of Interior Architecture at a private university. The aim of the course was to develop students' knowledge and awareness towards inclusive design by analyzing a campus environment with empathic modeling.

2. INCLUSIVE DESIGN

Inclusive design, universal design and design-for-all concepts focus on the principle of inclusion of all, acknowledging diversity and equality (Altay & Demirkan, 2014). These concepts provide a means for understanding accessibility and considering diversity within user groups, in other words, they intend to reflect a design philosophy that recognizes, respects, and "attempts to accommodate the broadest range of human abilities, requirements and preferences in the design of environments" (Bühler & Stephanidis, 2004: 81; Darzentas & Miesenberger, 2005).

Inclusive design, which is defined by the UK government and used interchangeably with design-for-all, ensures that environments and products address the needs of people with diverse capabilities and characteristics (Morrow, 2002; Dong et al., 2005). As Altay and colleagues (2016: 1124) note inclusive design "embraces and accommodates the differences among people, and offers variety of solutions that accounts for these". Universal design, developed from the field of architecture in the USA, is defined as "the design of products and environments to be usable by all people to the greatest extent possible without the need for adaptation or specialized design" (The Center for Universal Design, 1997: para.1). Universal design is characterized by the seven principles that are equitable use, flexibility in use, perceptible information, simple and intuitive use, low physical effort, tolerance for error, size and space for approach and use. Design-for-all is defined as the "design for human diversity, social inclusion and equality" (EIDD Stockholm Declaration, 2004). It aims to enable all people to have equal opportunities to participate in every aspect of society, in order to achieve this, environments/spaces and products need to be accessible, convenient to use and responsive to human diversity (EIDD Stockholm Declaration, 2004).

In the field of human diversity, different disability groups are included. It is widely accepted that people with disabilities have fewer opportunities and a lower quality of life than those without disabilities (Ünal, 2020). For this reason, the aforementioned concepts and their awareness are particularly important. According to the declaration (ICF-International Classification of Impairments, Disabilities and Handicaps) published by the World Health Organization (WHO) in 1980, disability reflects the decrease in the functional performance and activities of the individual. Disability represents person-level disorders (ICF, 2001). Disabilities may be cognitive, developmental, intellectual, mental, physical, sensory, or a combination of multiple factors. The current study concentrates on one of the sensory disabilities that is vision impairment. Vision plays a vital role in learning the surrounding world. Thus, vision loss makes it difficult to lead a normal daily life. According to the WHO, there are 285 million people in the world with visual impairment, 39 million of whom are blind, and 246 million with low vision (Patil, et. al., 2018). These rates indicate the need for a special construction of the built environment in order to increase the studies on visually impaired individuals and to facilitate their lives.

Especially, designing public environments such as airports, hospitals, shopping malls and university campuses according to users with diverse needs and capabilities is an important issue for the design professions. Architects and designers of the built environment are considered to be advocates for inclusive design. They need to ensure that the built environment enables all people to participate equally in all the activities and does not provide barriers. Inclusive design places users at the center of the design process in which they are the primary stakeholders instead of the designers (Altay et al., 2016). A user-centered approach incorporates inclusive design. As a result, user-centered approach requires an empathy with the diverse users of the environment who differ in age, sex and capabilities (Altay, 2017).

3. EMPATHIC DESIGN

Empathic understanding refers to stepping out of the designer role and stepping into the user role who experiences the built environment (Kouprie & Visser, 2009). In the user-centered, understanding the user and his/her experience with the built environment is considered central. Empathy considers relating to rather than knowing about the user (Kouprie & Visser, 2009). Empathic design enables designers to get closer to the lives and experiences of users in order to understand whether their design satisfies the user's needs. Postma and colleagues (2012) assert that empathic design enables designers to develop a rich cognitive and affective understanding and a feel for the users when designing environments for users with different abilities.

Kouprie and Visser (2009) identified three empathic research strategies during the design process. The first strategy is "direct contact with users through ethnographic methods of observation, shadowing and interviewing" (Altay & Demirkan, 2014: 198). The second strategy is empathic "communication through user research findings, storytelling, photography and original quotes" when direct contact is not possible. The third strategy is simulating the user's situation by role-playing or adaptation of a certain disability by the designer (Altay & Demirkan, 2014; Kouprie & Visser, 2009). Role-playing can "build an understanding of how life is experienced by various users" (Moody, Mackie & Davies, 2011: 195).

In the educational context, role-playing is applied widely in which experience-based exercises are conducted that simulate disability problems such as loss of vision, hearing, motor and other impairments (Altay et al., 2016; Altay & Demirkan, 2014). Role-playing is considered significant for the design disciplines since it encourages students to empathize with potential users and provide solutions accordingly (Altay et al., 2016). To develop the students' awareness of the needs of people different from them, students are able to simulate disabled users and can shift their designer point of view to a user point of view in order to see the built environment from the view of the disabled.

For this purpose, the main objective of this study is to highlight the importance of designing for different group of users under the concept of inclusive design. In addition, it is thought that the inclusion of inclusive design and design for diverse user groups in the design education process; will contribute to the awareness of designers through the training process. Therefore, the main hypothesis of this study is stated below:

H1: The inclusion of inclusive design, universal design and design-for-all concepts in the design education process will raise student's awareness in terms of understanding diverse user groups.

To test the above hypothesis in accordance with the purpose of the research the methodology developed and findings are given below.

4. METHOD

4.1. Course Design

For the study, an experimental inclusive design themed elective course was developed. The course was taught between the months of October and December within the undergraduate curriculum of the Interior Architecture department of a private university. The course was a two-hour single-semester course that consisted of weekly meetings. The first half of the semester was conducted as lectures and the students learned about the concepts of universal design, inclusive design and design-for-all. The students became familiar to the concept of disability and different types of impairments. In the second half of the semester, the students prepared presentations regarding the application of the concept to the built environment. Examples from the built environment were analyzed whether they were accessible or acted as barriers.

As a final project of the course, the students had to evaluate the university campus and experience the campus environment by empathic modeling with role-playing method. They had to access the building and perform a specific activity by simulating a user with vision impairment by wearing eyeglasses covered with black light-proof tape. This empathy experience produced uncomfortable conditions for the students in a building that they were familiar with. While simulating a disabled person they had to report their new experiences and the difficulties that they encountered.

4.2. Participants

The participants were 30 students studying in the department of Interior Architecture. There were 12 female and 18 male students between the ages of 18-22 who were enrolled in the elective course. Participation to the course was on voluntary basis. The students evaluated and experienced a building of the campus from the perspective of a visually impaired user.

4.3. Research Design

While the students made their assessments, they had to consider and evaluate the building according to five categories based on Danford and Tauke's (2001) definitions of the following five essential design elements (cited in Afacan & Erbuğ, 2009):
"1. Entering and exiting; identifying and approaching the entrance and exit and maneuvering through them.
2. Circulation systems; ramps, elevators, escalators, hallways and corridors.
3. Wayfinding: paths/circulation, markers, nodes, edges, and zones/districts; and graphical information.
4. Obtaining product/services; service desks, waiting areas and shops.
5. Public amenities; public telephones, restrooms and seating units" (Afacan & Erbuğ, 2009: 735).
These design elements are considered to be general building issues that users come across in most of the facilities. Danford and Tauke (2001: 16) claim that "buildings that facilitate these activities for the widest possible population are more usable by everyone". Therefore, Danford and Tauke's (2001) categories are utilized in the study to evaluate one part of the university campus in terms of universal design principles.

5. FINDINGS

The experiences of the students were categorized according to the categories indicated by Danford and Tauke (2001).
Entering and exiting: When entering and exiting the campus environment from the gates, there were no textured paths to guide the students to their destinations on the pedestrian sidewalk. Other problems that were experienced by the students were the changes in the level of the pedestrian sidewalks and the location of the signage system on the sidewalks. Identifying the entrance of the building in between the A and B blocks was problematic, since the entrance was not differentiated; there were no tactile signage indicating the entrance or a signage system in Braille. The entrance of the building was not clearly distinguishable from the rest of the building. When encountering a door inside the building, the signage system was not in Braille as a result the user was unable to identify which facility it was and the location of the signage system was situated above the eye level on the walls. Some of the doors of the facilities could not be distinguished due to the material of the door. In some cases, the position and size of the door handle was inappropriate for the disabled users.
Circulation systems: The circulation systems within the building consisted of long distances of travel with no tactile information. Seating units, plants and columns were situated in the travel path of the users especially in the hallways and corridors with no warnings. Although the seating units and plants were situated close the walls, the students had to touch the walls in order to find their way and this caused them to trip over.
Stairs, ramps and ground surfaces were identified as problems related to the physical features. The students indicated the lack of indication about the steps situated on the pedestrian sidewalks and the unequal spacing between the treads and risers. The start and end points of the steps at the outside

and within the building were not indicated. There were no textured plates indicating the physical barrier. The stairs outside and inside the building did not have handrails to support and guide the students, as a result the students could not determine where the stairs started and ended. It can be commented that the principle of tolerance for error was not considered. There were no ramps inside the building; likewise, the ramps outside the building were not easily accessible due to the cars being parked in front of them. In addition, the slope of the ramps on the campus did not have the appropriate gradient and no appropriate handrail was provided for the ramps causing more difficulty for the students.

Wayfinding: Wayfinding in the campus environment was problematic because the path of travel was unclear. Maps or graphical signage systems in Braille were not provided, that caused disorientation for the students. Textural paths could have been integrated with the circulation paths to provide the users with directional cues and help with orientation. Other problems that were experienced by the students were the changes in elevation of the pedestrian sidewalk and the location of the signage systems on the sidewalks. There were no textural plates to inform the students that there were steps or a signage system in their way. The path of travel for the visually impaired students was not identified as a result they had trouble finding their way to the building. In some cases, bushes, trees, sign systems and cars were obstacles during their navigation and caused frustration for the students. Wayfinding inside the building was not legible. The five elements that contribute to wayfinding, which are landmarks, paths, edges, districts and nodes (Lynch, 1960), did not guide the visually impaired user and caused the user to be disorientated.

Obtaining product/services: As an activity to be performed in the building, the students had to utilize the cafeteria, which is located on the first floor. The blindfolded students commented on the difficulty in finding the stairs. They had to rely on their friends to lead them to the stairs. Although the students were familiar with the building and knew where the cafeteria was, they indicated that people unfamiliar with the building would not be able to find the information sign. There was no indication of the start and end points of the stairs by textural surfaces or by handrails. The path of travel in the cafeteria was undefined. The students indicated that they could bump into tables, chairs, partitions, plants, columns and counters if their friends did not guide them. While obtaining the dishes from the food counter, the students reported that they had to touch every part of the counter in order to get the dish and place it on their trays. While doing this, they either knocked the dishes over or had their fingers dipped into the dishes which they indicated was embarrassing. Overall, the students indicated that obtaining the dishes, carrying the tray, walking through the narrow aisles between the tables and finding a vacant table was problematic and difficult.

Public amenities: The students encountered the problem of hygiene in the restrooms. In order to navigate, the students had to touch all of the surfaces, which is normally not done by the able students. They felt uneasy in the restrooms. In some of the restrooms, the faucets and towel dispensers were automatic, but the other amenities had to be done manually. Overall, the students indicated that although the environment was familiar, experiencing it from the perspective of a visually impaired person was uncomfortable. The students felt helpless, nervous, worried about falling, tripping, bumping into obstacles or stairs and were dependent on their friends. They had to move much more slowly than usual that affected their tolerance.

6. DISCUSSION AND CONCLUSION

The experimental inclusive design course that was taught with empathic modeling helped the students to experience the difficulties of a visually impaired student in a campus environment. The students claimed that their active involvement helped them to empathize and become aware of the needs and differences of potential user groups. With respect to the campus environment, it was noted that adding handrails to both sides of ramps and stairs, changing the ground surface texture at entrances of buildings, at the beginning and end of ramps and stairs, and at nodes that are the focal points of decision, providing tactile maps and signage systems and clearly defined paths of travel without physical barriers around the campus and inside the buildings would help and guide the visually impaired students. Memikoğlu (2014) indicated that having a separate elective course prior to inclusive design would be beneficial since the students learnt the concept in the 2nd year of their education in one lecture of a three-hour compulsory course that was at a basic level. As a result, they were unable to apply the concept to their design projects. This experimental inclusive design course increased their awareness towards the concept and to their built environment.

Architectural design as a problem solving activity requires understanding the needs of diverse user groups that may vary in age, size and abilities. Designers need to acknowledge, observe and understand the variety of needs and design according to all people without stigmatizing or discriminating them from the built environment. Inclusive design makes sure that the built environment addresses the needs of people with different abilities and characteristics, and enables all the people to participate equally in all activities and does not cause barriers. In inclusive design, the users are placed at the center of the design process instead of designers and an empathic design approach is considered. In this study, the adaptation of a certain disability by the designer, as a strategy of empathic design was used to evaluate the built environment from the perspective of a visually impaired person. The students shifted from a designer point of view to a view of the disabled. Although the students were familiar with their built environment, which was a campus environment, the students encountered problems and became aware of the barriers within the built environment that they were not aware of while experiencing the environment from the perspective of a visually impaired user. In other words, the built environment had an impact on their participation and engagement in their everyday activities.

This study showed that empathic modeling was beneficial in understanding inclusive design and allowed students to develop awareness towards the inclusion of the people with different abilities in the built environment. Therefore, inclusive design has to be emphasized as a fundamental and inseparable aspect of the design education. In addition, students need to be encouraged to consider the inclusive design approach in different courses of the design education. As a result, throughout their design education, they will develop an accurate understanding of the inclusive design approach, design environments/spaces and products that are accessible to a diverse group of users in their design courses and continue to consider this approach in their professional lives (Helvacıoğlu & Karamanoğlu, 2012; Memikoğlu, 2014).

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