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# Experiential learning approach to barrier-free design in architectural education. A method involving different stakeholders, simulation, mapping, and creative design

## Abstract:

The paper presents a case study from Sarajevo, Bosnia and Herzegovina on experiential learning approach to accessibility, inclusion and universal design in architectural education in line with the global communities' efforts in raising awareness and fostering education on the needs of persons with disabilities. The study is particularly relevant due to the fact that the ongoing Covid-19 pandemic and consequent safety measures amplified marginalization of people with disabilities. Bosnia and Herzegovina over the years failed to deliver on many basic principles signed in the Convention on the Rights of Persons with Disabilities. Although scientific stance in literature review is divided on the subject of disability simulation activities as education method, this paper argues in favor of experiential learning, provided that the activities are carefully conceptualized over an adequate time period and involve different stakeholders, including persons with disabilities. The study was conducted through three different frameworks: theoretical, practical and creative design process in collaboration between a higher-education institution, a clinical center, and a civic non-profit organization of people with disabilities. The workshop outcomes surpass documenting student attitudes towards the topic and provide site mapping for accessibility improvement interventions, creative design solutions in improving the quality of public space and public outreach activities.

Key words: accessibility, experiential learning, architectural education

## 1. Introduction

This paper aims to present a case study of experiential learning approach to inclusion, accessibility, barrier-free spaces, and universal design principles in line with the international community's efforts seeking to raise awareness and foster education expressed through the Convention on the Rights of Persons with Disabilities (CRPD), The New Urban Agenda, UN Sustainable Development Goal 11 and World Urban Forum Declaration on Cities 2030. The main participants are undergraduate and graduate architecture students, who were tasked to conduct a real-life simulation and observation of everyday obstacles within a given physical environment and provide design solutions in creating an inclusive environment for persons with disabilities. Based on the case study, literature review of accessibility in architectural education, experiential learning, and current ongoing global challenges, this paper provides ground arguments for immersive strategies in implementing accessibility within an architecture curriculum. It further elucidates the need for detailed surveys on methods of incorporating accessibility, inclusiveness, and universal design into architecture education.

The overall goal set forth by the UN Sustainable Development Goal 11 concerning cities and all types of human settlements is to make them inclusive, safe, resilient, and sustainable.

The New Urban Agenda - Habitat III<sup>1</sup> adopted by UN General Assembly states commitment to promoting

appropriate measures *"that facilitate access for persons with disabilities, on an equal basis with others, to the physical environment of cities, in particular to public spaces, public transport, housing, education and health facilities..."* as well as other public related facilities and services.

The WUF9 Declaration on Cities 2030<sup>2</sup> supports the adoption of *"accessibility and universal design principles into national, subnational and local action plans for implementing the new Urban Agenda through inclusive, accessible and participatory processes."*

The Convention on the Rights of Persons with Disabilities (CRPD)<sup>3</sup> having accessibility as one of the general principles, addresses the importance of enabling *"persons with disabilities to live independently and participate fully in all aspects of life."* Article 9 of the CRPD describes that States Parties of the CRPD are to undertake appropriate measures, including legislation, to ensure access to the physical environment, services, transportation, information, and communications systems to all people with disabilities. Accessibility is to be enabled to all public-oriented facilities and services in both, urban and rural areas. This also includes private entities that provide public services.

In approaching any of these goals, it is important to recognize the diversity of people with disabilities. Disabilities come in many forms- single and multiple; physical and psychological; permanent and temporary. Architects and urban planners, in particular, need to be

consistently aware that physical barriers create movement and participation restrictions in everyday life and activities, not only to persons with some form of disability, but to other demographics as well, such as small children, the elderly, pregnant women or parents pushing strollers. Therefore, the subject of inclusive design and accessibility in architectural education should not be communicated simply through theory, design principles and accessibility standards, but rather through a wholesome social context that affects around 15% of world population (WHO)<sup>4</sup>.

The case study from Sarajevo, BiH presented in this paper was conducted as a workshop over a several weeks period in May 2014. The relevance to contemporary setting is explained in further text.

### 1.1. Current global and local context

Although, the country of Bosnia and Herzegovina signed the Convention on Rights of Persons with Disabilities in 2010, its government and institutions over the years repeatedly failed to deliver on the basic principles described in the document. It is estimated that persons with disabilities make about 10% of the country's population<sup>5</sup>. Efforts in addressing their basic needs, particularly in terms of architectural barriers remain proclamatory without significant action. In the building and construction practice in Bosnia and Herzegovina, to this day, codes and regulations concerning architectural barriers often lack proper or any execution at all. The reality is that developers rarely face significant penalties for failing to ensure the minimum code requirements, especially considering that even essential public facilities most often do not provide proper accessibility and equal space utilization. The problem of architectural barriers and discrimination of persons with disabilities in BiH starts at their homes' doorsteps. Unscrupulous examples of constructed architectural spaces directly discriminate and exclude persons with disabilities from everyday activities and content.

In architectural education in BiH none of the existing programs currently provide a stand-alone course specifically dedicated to accessible, inclusive, or universal design. If brought into focus, accessibility generally relies on theoretical knowledge acquisition, application of standards and regulations onto design studio projects and drawings.

In light of the ongoing challenges created by the Covid-19 pandemic that amplified marginalization of person with disabilities, it is important not to lose sight of the life-altering obstacles architectural barriers, in addition to many others, create. People with disabilities have been significantly more impacted by the global pandemic and consequent safety measures that became a norm for the last couple of years. Healthwise, people with disabilities are generally more susceptible to Covid-19 related complications as they often suffer from existing underlying conditions. Policy wise, efforts in making urban places more accessible have been hindered by lockdowns, shelter-in-place orders and limited access to public spaces and facilities. The consequences of such policies increased isolation for people with disabilities. Furthermore, limited access to

healthcare facilities created more difficulties and risks for the most vulnerable populations.

Another argument for the study's current relevancy is the application of experiential learning approach to barrier-free design in architectural education, which is at times praised and at other times criticized in academic literature. The underlying difference this case study provides is importance of different stakeholder involvement, particularly persons with disabilities, and the workshop outcomes that provide creative design ideas for everyday public use. The consequent public outreach additionally reinforces positive outcome beyond student attitude change.

Furthermore, the pandemic created an unprecedented transition in higher education learning. Universities around the world were conditioned to enforce an online learning format, significantly limiting in-person education. This shift is likely to stay in one form or another, but it raises questions about the future of experiential learning particularly in architectural education.

### 2. Accessibility in architectural education and the experiential learning approach

Architectural education standards around the world vary greatly. A comparative analysis conducted by the COAC - Architects' Institute of Catalonia under the auspices of International Union of Architects (UIA)<sup>6</sup> shows high variation of core requirements across countries. Apart from rudimentary differences like duration of education, school and student number ratio compared to country population, the educational standards vary in significant aspects such as the existence (or lack) of a regulating authority, internship opportunities and course requirement focus from art and design to more technical content.

The UNESCO-UIA Charter for Architectural Education<sup>7</sup> highlights relevant objectives that call for an understanding of the social context and built environment, as well as requirements to relate these relationships to human needs, scale, ergonomics, equity, and access.

Among its core principles the UIA "*acknowledges the responsibility of architects to contribute to the provision of universal access throughout the built environment.*"<sup>8</sup>

Implementation of universal design within architecture curricula is another subject of discussion in programs around the world. The concept consists of seven general principles: 1. equitable use, 2-flexibility in use, 3-simple and intuitive use, 4-perceptible information, 5-tolerance for error, 6-low physical effort and 7-size and space for approach and use. As such, universal design is often subject to skepticism related to its validity, as the topic is considered somewhat utopian (De Cauwer et al, 2009).

One of the major challenges in design programs essentially is the general lack of understanding of the difference between accessibility and universal design. The concepts are often used interchangeably by design faculty and instructors (Basnak et al, 2015). The lack of more immersive strategies of implementing accessibility in design programs can be therefore also attributed to the lack of clarity and understanding on the subject matter. Based on a study of continuing professional

development (CPD) materials in architectural practice of several countries around the world, O Shea, Basnak, Bucholz and Steinfeld (O Shea et al, 2018) underline the desire of practicing architects for experiential learning opportunities through guided tours of buildings and spaces, direct testimony, simulation exercises of physical and sensory impairments and more.

Over the last few years, the awareness of employing an experiential learning approach to accessibility and universal design in architecture education around the world significantly increased. Literature review on the topic provides plenty of examples with architecture students experiencing disability simulation activities (Mulligan et al, 2018; Sungur A., 2013). The simulation activities are often conducted through focus groups navigating within university campuses or individual interviews. This type of learning approach has also drawn criticism and considered moderately helpful in improving student attitudes towards people with disabilities, some even calling for educators to cease use of such activities (Pebdani, R., & Bourgeois P.J., 2019; Ryhl, 2018). The method is generally criticized because of the absence of affected users themselves and ethical concerns of deepening the stigma around disability. In optimizing the benefits of learning through simulation exercises and addressing negative consequences careful implementation is crucial (Terashima et al, 2021).

This research underlines benefits of experiential learning approach in architecture education when involving different stakeholders, including persons with disabilities, carefully conceptualized over an adequate period of time.

### 3. Case study- A workshop in Sarajevo, Bosnia and Herzegovina

Motivated by the absence of subject matter in existing curricula, the workshop titled "Sit in my chair" was specifically tailored by the author for architecture students, considering their future role in professional practice that involves planning, designing, organizing, or remodeling a myriad of different spaces within the built environment. Understandably, it is crucial that the future creators of our surroundings develop awareness for the needs of persons with various types of mobility restrictions, learn to recognize, solve existing obstacles, and provide all users with equal opportunity for access and utilization of spaces. Institutions that took part in this collaboration from May 19<sup>th</sup> to June 5<sup>th</sup>, 2014, are the International University of Sarajevo, Sarajevo University Clinical Center and Association of Paraplegics and suffering of Polio of Canton Sarajevo. Twenty undergraduate and graduate architecture students took part in the workshop.

The workshop was organized in three frameworks: theoretical, practical, and creative. The theoretical part is based on several lectures throughout the workshop starting with a seminar organized at the Institute for Scientific Research and Development of the Clinical Center of Sarajevo as first step of knowledge acquisition. Participants of the workshop and additional audience had a chance to hear expert lectures and more importantly, personal experience testimonial by persons with disabilities in attendance.

The President of the Association of Paraplegics and suffering of Polio of Canton Sarajevo, who spent most of her life working to raise awareness about the problems of people with disabilities in BiH, shared her own valuable experience from viewpoint of a person in a wheelchair, as well as many examples of discrimination encountered through her work at the Association. A fellow IUS student was also invited as guest speaker to share her experience of person with visual impairment and explained the most common obstacles she encounters in everyday life. Particularly important was her insight on the various levels of visual impairment, as well as color, shade, texture and noise influence on a person using a white cane to navigate through space. The theoretical part included lectures on architectural barriers and possible solutions held by two architecture field experts and a defectologist about inclusion of persons with disabilities in everyday life.

The practical part of the workshop was conducted on a different day, allowing participants time to debrief on the information gained from the seminar. It was conducted within the Clinical Center campus where the participants were accompanied by security staff and medical professionals to ensure their safety. The assignment involved various simulation activities allowing students to put themselves in the role of people with disabilities while facing different physical obstacles. Students were divided into three focus groups:

- observers
- caretakers/helpers
- role-players in wheelchairs, with crutches, and blind-folded

Participants moved around the campus for several hours using medical aids and documenting observations and experiences. The movement route was determined around two main campus entrances and the existing traffic communication between them. The Campus itself consists of multiple facilities and clinics. Entrance of vehicles is generally allowed only for scheduled appointments or visits, while car parking is provided in dedicated campus areas as opposed to areas around individual clinics. This means, that patient and visitor movement within the campus in general, or

Fig. 1. Mapping of critical areas within the Clinical Center campus based on criteria of inability of independent access as a person with disabilities. *Source: workshop results*

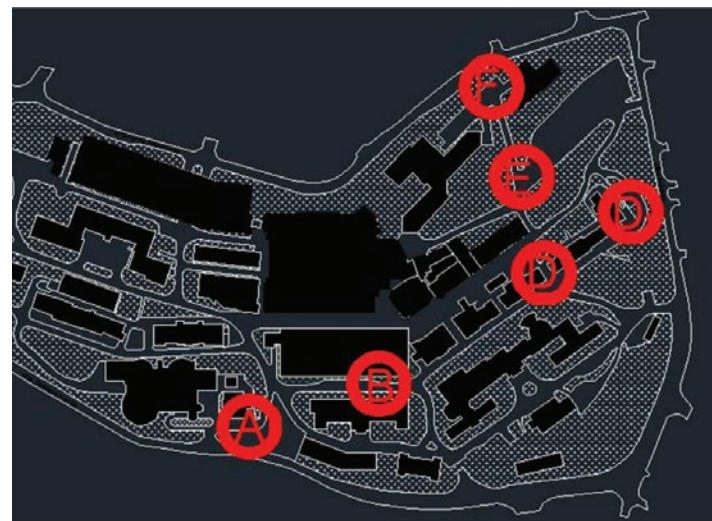






Fig. 2. Participants encountering various types of physical barriers while navigating around the Clinical Center campus Source: workshop photo documentation



from clinic to clinic, is predominantly pedestrian. In essence, the campus served as a model of a small city within a city, perfectly conceptualized for the needs of the intended observations. Immediately after completing the simulation activities, while still at the location, the participants were each asked to share their observation in a video recorded interview.

Following are observations of obstacles and physical barriers documented during the simulation exercise:

- Absent or inadequate ramps at facility entrances for wheelchair access  
When present, majority of existing ramps have an inadequately steep slope, different from facility to facility. Participants also observed the lack of handrails for safety and rough pavement surfaces or bumps creating friction and making individual wheelchair use difficult
- Inaccessible sidewalk  
Sidewalks were generally narrow with different types of obstacles including trees, streetlight poles and manhole shafts sticking above the surface level. The sidewalks are generally high with parking bumper blocks placed along their edges, but no curb cuts for wheelchair access.
- Lack of dedicated parking spots  
When present, parking spots for persons with disabilities are not clearly annotated (or the paint has washed off), making them hard to identify. Access from the dedicated parking spots for people with disabilities in front of the main campus building that hosts multiple clinics is hindered by the lack of curb cutters and conditions navigation around vehicle traffic to enter the building premise.
- Resting and relaxation areas are inaccessible for wheelchair users
- Campus entrances accessible only by stairs on the north side, where coincidentally the Clinic for Orthopedics and Traumatology is placed, and the use of orthopedic aids and wheelchairs is more prevalent compared to other clinics.
- Existing facilities are generally of older construction without elevators that limit entrance only to the main halls with little to no vertical communication options for person using medical aid equipment for movement. Particularly troubling observation was that restrooms for people with disabilities were completely inadequate and, in most cases, used as storage of cleaning equipment.

As a result of the workshop the exact mapping of critical points has been provided to the Sarajevo University Clinical Center to use as basis for accessibility improvement interventions.

Additionally, a design solution for the main campus building entrance was provided displaying proper access from designated parking spots to the entrance hall with particular attention to sidewalk access, tactile paths and canopies providing shade.

In addition to the physical obstacle observed, the immediate recording of participants experience provided direct insight into their emotional experience and attitude towards the given environment. Irrelevant of their assigned role, all participants agreed that the simulation

activity presented an eye-opening experience that would never catch their attention in the same way if presented in classic classroom setting. One of the main observations that was underlined by participants in wheelchairs was the need to move around freely and individually without the help of caretakers. One student who was assigned a caretaker throughout the whole period expressed strong frustration and a feeling of helplessness. All role-player participants expressed the need for more resting stops and dissatisfaction because the existing ones were not accessible to all. The participant with blindfolds expressed an overstimulation of senses and disorientation in noisy and busy areas.

All of the documented observations and experiences were discussed in the following creative framework over the next few weeks. Together with the author who coordinated and lead the process, participants analyzed their findings, did literature research, exchanged their individual experiences, and approached the problem from an architectural design perspective. This resulted in the design of two universal units for public spaces, not restricted to a single location use.

Based on the expressed need for more resting points that will provide temporary relief to persons with disabilities in public areas and eliminate the fear of disorientation, a resting unit was designed with a parametric shape, tactile path leading to it from both entrance directions, and seating areas designed so that a person in a wheelchair can easily be accommodated within. The unit is just as applicable within the Clinical Center campus as anywhere in the city.

Another unit was designed according to the principles of universal design and named "universal kiosk". During the workshop, it was concluded that people with

Fig. 3. Universal resting unit for persons with disabilities. Authors: M. Hodzic, A. Kunic, M. Halilovic, K. Karajko, E. Avdovic, Mentor: T. Tufek-Memisevic



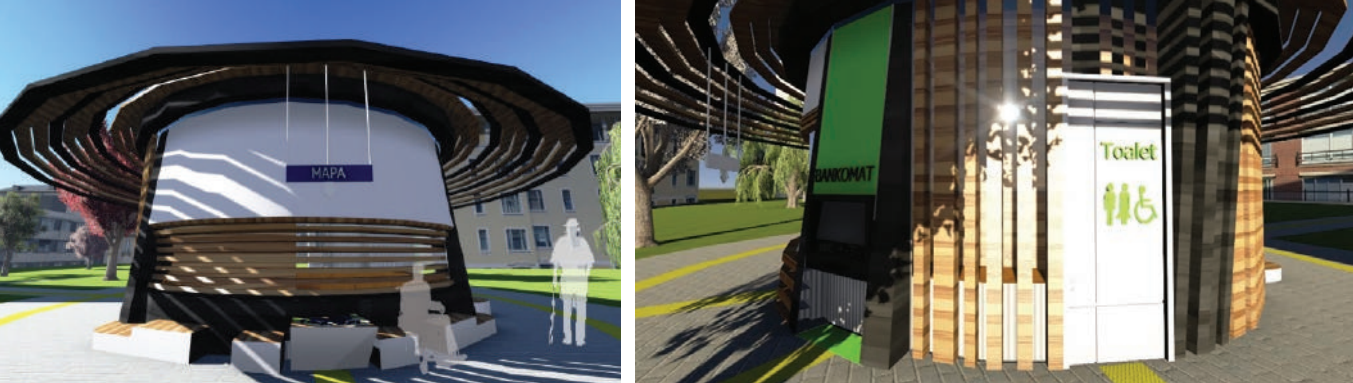


Figure 4: Universal kiosk. Authors: E. Guven, O. F. Mukul Mentor: T. Tufek-Memisevic

disabilities, in addition to space constraints, are also subject to outdoor time constraints, mostly due to the lack of accessible public restrooms.

The unit was designed in circular shape, containing necessities that would allow persons with disabilities to have a longer and more comfortable outdoor experience. It enables them also to socialize and easier integrate into public life. The unit features a small kiosk with a desk adapted for wheelchair users, an ATM, an accessible restroom, and seating area. The unit provides shelter from precipitation and all parts are visually marked for people with hearing impairments. A tactile path leads to and around the unit, and a 3-dimensional model of the location helps the blind and visually impaired to orient themselves in that part of the city. The benches are designed for use by adults, children and people in wheelchairs

The case study approach, observations and resulting design proposals were presented to an audience open to the public on June 5<sup>th</sup> 2014. The results were greeted with approval and positive remarks particularly from audience members with disabilities. Further public outreach with the workshop conclusions putting the focus on physical barriers in the BiH's public environment was done through several media coverages, guest lectures at other higher-education institutions- the International Burch University and Medical Faculty of University of

Sarajevo in the following years. The designed universal units were also presented at the Collegium Artisticum 2015 annual architecture exhibition organized by the Association of Architects in BiH.

#### 4. Conclusion

This paper, aims to underline the beneficial outcomes of experiential learning approach when involving different stakeholders, including persons with disabilities, tailored specifically for architecture students where the study does not revolve only around student attitude improvement. The case study activities were not solely conducted as an outdoor simulation but a three-week long workshop in collaboration between a higher-education institution, a clinical center, and a civic non-profit organization of people with disabilities. The workshop outcomes surpass documenting student attitudes towards the topic and provide site mapping of the recognized barriers, creative design solutions and public outreach. A seminar with lectures and testimonials of persons with disabilities preceded the simulation activities conducted under professional supervision. The following days resulted in additional lectures and reflection on acquired observations and experiences. In addition to a heightened sense of awareness of identified architectural barriers among participants, as well as the desire to avoid such obstacles in future projects,



the workshop produced actual design proposals in improving everyday public life of persons with disabilities. These solutions were later presented to an audience that included persons with disabilities and welcomed with positive remarks.

The educational and public outreach efforts set off by the case study outcomes were multiple over the following years and include media coverage, project presentation at other higher-education institutions and public exhibit of the design results.

The issues regarding architectural barriers in Bosnia and Herzegovina are still present and little has been done to change the disadvantaged status of persons with disabilities in the country. As a result of the ongoing Covid-19 pandemic, this vulnerable demographic has become even more isolated.

Taking into account all of the aforementioned, the study makes a strong case in favor of experiential learning about accessibility in architectural education, provided that the activities are carefully conceptualized over an adequate time period, involve different stakeholders as

opposed to being rushed through a one-hour class attempt in simulation activity without involvement of actual persons with disabilities. The study also provides mapping and relevant conclusions for accessibility improvement interventions of the observed site location.

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#### ENDNOTES

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