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# Sensitization of designers to the needs of people with disabilities. Application of experiences in residential interior solutions in Milan

**Abstract**
The coordinated experimental and design activities presented in this article are dedicated to the topic of design for people with disabilities. They involve two dimensions. The first and most significant is to draw the attention of future designers and current Interior Design students to the challenges in using space encountered by people with disabilities. To achieve this, sensitization training (workshops) was conducted through simulated disability experiences. Personal experiences and the identification of real difficulties in accessing the surrounding space served as a starting point for design activities: solutions for residential spaces intended for use by people with disabilities in Milan along Via De Amicis. The projects were carried out in collaboration with the Politecnico di Milano as part of the Collaborating Classroom initiative, aimed at jointly achieving educational goals in different parts of the world using a shared digital environment and information and communication technologies (ICT). The basis for interior development was architectural projects created by students within Design Lab1 under the guidance of Prof. Marco Lucchini. The subject of the architectural project was a five-story residential building, in which some units were fully adapted for wheelchair users, crutch users, or blind individuals. Changes, modifications, and improvements made by the students were based on individual experiences of simulating disabilities through the execution of organized tasks outlined in a proprietary accessibility questionnaire (Table 1, 2). Observations of movement, overcoming obstacles, using toilets, and other pieces of furniture were used to create non-obvious functional-spatial solutions linked to design solutions from the field of interior design and design.

Keywords: sensitivity training of designers, simulated disability, residential interior design

## Introduction

The coordinated experimental and design activities presented in this article are dedicated to the topic of design for people with disabilities. They involve two dimensions. The first and most significant is to draw the attention of future designers and current Interior Design students to the challenges in using space encountered by people with disabilities. To achieve this, *sensitization* training (workshops) was conducted through simulated disability experiences. Personal experiences and the identification of real difficulties in accessing the surrounding space served as a starting point for design activities: solutions for residential spaces intended for use by people with disabilities in Milan along Via De Amicis. The projects were carried out in collaboration with the Politecnico di Milano as part of the Collaborating Classroom initiative, aimed at jointly achieving educational goals in different parts of the world using a shared digital environment and information and communication technologies (ICT). The basis for interior development was architectural projects created by students within Design Lab1 under the guidance of Prof. Marco Lucchini. The subject of the architectural project was a five-story residential building, in which some units were fully adapted for wheelchair users, crutch users, or blind individuals. Changes, modifications, and improvements made by the students were based on individual experiences of simulating disabilities through the execution of organized tasks outlined in a proprietary accessibility questionnaire (Table 1, 2). Observations of movement, overcoming obstacles, using toilets, and other pieces of furniture were used to create non-obvious functional-spatial solutions linked to design solutions from the field of interior design and design.

## 1. Methods

The authors used research methods and techniques which led to an application in student projects. The following were performed:
(a) (2.1.) analysis of the literature on the usefulness of sensibilization training through simulated disability
(b) (2.2.) simulated *disability sensitization workshops* with simultaneous accessibility test following dedicated questionnaire
(c) a discussion was held on the results of the study and the sensations and experiences of the participants
(d) (2.3.) application of research conclusions in interior design project

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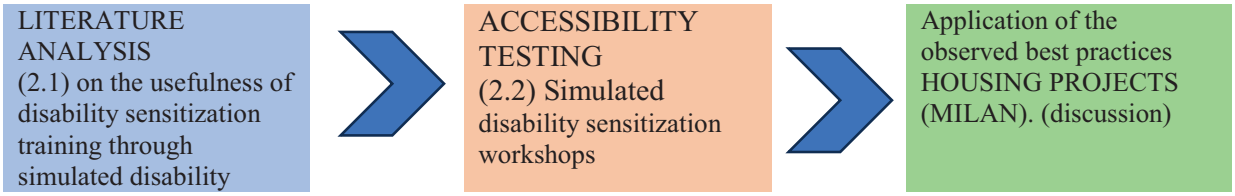



Ill. 1. Diagram of the work, author: A. Bonenberg

**1.1. Literature Analysis**

Sensitizing the social environment to the needs of people with disabilities is a goal pursued by scientists and practitioners in the fields of healthcare, sociology, and psychology. The methods for achieving this goal can vary, and one confirmed approach is sensitization training through simulated disability. The utility of this method is supported by numerous publications, including the article "Simulated disability exercises and their impact on attitudes toward persons with disabilities" published in the International Journal of Rehabilitation Research (Grayson, Marini, 1996, pp. 123-132). The experience of simulating physical disability, involving a series of activities performed by rehabilitation graduates, is described in the article "Disability Simulation as a Strategy for Attitude Change" (Sawyer, Horace, Dave, et al., 1980, p. 141). The results demonstrated the effectiveness of disability simulation in positively changing attitudes towards certain disabilities and issues related to body positivity and the perception of disabled individuals.

An assessment presented in the article revealed that the attitude change in individuals who underwent the experience remained stable for a period of four months after the disability simulation. Researchers attribute the success to using disability simulation in training programs. The method's effectiveness has been confirmed for other age groups by studies published in the article "Effects of awareness interventions on children's attitudes toward peers with a visual impairment" (Reina, Raula, López, et al., 2011, p. 248), which focused on sensitizing groups of teenagers. The study also indicates that the longer the experimental experience, the better the sensitizing results were achieved. In the scientific debate, critical voices questioning the utility of training through simulated disability are also heard. Such a conclusion can be found, among other places, in Sally French's (1992) article "Simulation Exercises in Disability Awareness Training: A Critique," published in "Disability, Handicap & Society." In this text, the author suggests that instead of using simulation as a way to understand the experience of disability, training on the equality of disabled individuals developed and conducted by disabled people should be employed.

Despite the ongoing discussion, the authors decided to conduct sensitivity workshops due to the significant educational value of the experience, especially for future spatial designers serving individuals with various dysfunctions. By organizing the exercises according to the questionnaire presented below and discussing the results, the workshops facilitated the memorization of spatial elements, the requirements that should be placed on them, as well as distances, dimensions, sizes, and other aspects of adapting spaces for people with disabilities.

**1.2. Sensitization to Disability Issues. Accessibility Space Study**

Simulated disability exercises took place at the Faculty of Architecture and Management Engineering of Poznań University of Technology and were conducted in May 2022. The research was carried out following applicable ergonomic and dimensional regulations [Act of July 19, 2019, on ensuring accessibility for people with specific needs (Journal of Laws of 2020, item 1062, as amended)], in the form of simulation workshops. During these workshops, a group of sixty individuals, divided into pairs, assumed the roles of people with mobility-limiting disabilities. These included:

- Individuals using manual wheelchairs,
- Individuals using crutches,
- Blind individuals move with covered eyes and using a white cane.

Each person simulating a disability was accompanied by an able-bodied assistant ensuring their safety. The

Ill. 2.AB, a person in a wheelchair, C a person using a cane for the blind, D, a person using a crutch, author: A. Bonenberg

students participating in the study had already completed training in universal design, ergonomics, and principles of composition. The workshops were preceded by lectures on universal design and the relevant legal regulations in this area.

In the second stage of the study, a tool in the form of a survey consisting of 114 closed-ended questions, using the Likert scale, and 114 open-ended questions was applied. The task for participants was to navigate through designated routes using equipment for people with disabilities. The entire research process concluded with interviews and an open discussion involving all participants to gather evaluations on the potential improvement of the current accessibility conditions of the evaluated building. This aimed at analyzing perceptions and individual insights. The operating procedure was as follows: the study was divided into routes C-D and D-E, covering sections of communication within the WAWIZ building. After completing each segment, the participants answered a series of questions prepared in the survey. The participants assessed the satisfaction level of the simulated disabled participant as follows: 5 for "very good," 4 for "good," 3 for "average," 2 for "poor," 1 for "bad or lacking."

**ROUTE: C-D**

POZIOM 0


Ill. 3. C-D Route plan, source:. B. Linowiecka

Table 1. Author's questionnaire on the accessibility of the space in the WAiWIZ building along the route "C-D," between the Dean's Office WA (D) and the restroom (C).

| | |
|---|---|
| 1. access to visual information that provides directions regarding the most important places<br>2. in the building (clear pictograms, high contrast).<br>3. overcoming the height difference.<br>4. Location of interior design elements and whether they are a barrier/ obstacle.<br>5. The height of the corridor communication space (not less than 2.2m).<br>6. The width of the communication space, and corridor, allows passing each other.<br>7. maneuvering space (wheelchair rotation).<br>8. Availability of seating areas for resting.<br>9. lighting of the route.<br>10. Accessibility of electrical system controls | 11. tactile paths (convex signage). Legibility of the transportation system.<br>12. continuity of the route.<br>13. visual information informing about the function of the room (clear pictograms, high contrast). Access to information about the function of the room in Braille.<br>14. Conspicuous signage on glazing to spot an obstruction.<br>15. The size and method of opening the toilet door.<br>16. Maneuvering space at the door.<br>17. The location and shape of the handle at the door to the WA Dean's Office.<br>18. Use of the reception counter.<br>19. Access to assistive listening system e.g. induction loop.<br>20. 1Distance from the main entrance through restrooms to WA Dean's Office. |

**TRASA: D-E**

POZIOM 0

POZIOM I


Ill. 4. D-E Route plan, source: B. Linowiecka

Table 2. Author's questionnaire on the accessibility of the WAiWIZ building space along the "D-E" route, between the WA dean's office (D) and teaching room 248 (E)

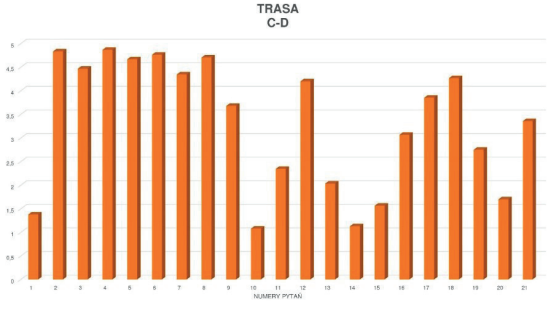
| | |
|---|---|
| 1. access to visual information indicating the direction to move towards the nearest elevator.<br>2. The size of the lobby in front of the elevator.<br>3. The dimensions of the elevator cab.<br>4. The width of the elevator door.<br>5. The maneuvering space in the elevator cab.<br>6. Control panels in front of the elevator cab.<br>7. Control panels in the elevator cab.<br>8. Touch panels equipped with voice control system.<br>9. access to the assistance (alarm) system.<br>10. Control panels equipped with Braille information.<br>11. maneuvering space at the door.<br>12. Size and method of door opening.<br>13. location and shape of the door handle.<br>14. The height of the corridor communication space (min. 2.2 m).<br>15. the width of the communication space, corridor, giving the possibility of passing each other.<br>16. maneuvering space (e.g., wheelchair rotation).<br>17. Availability of seating areas that can be used for resting.<br>18. illumination of the route. | 19. Accessible electrical system, access control devices, lighting operation.<br>20. Accessible tactile paths along the entire route.<br>21. Legibility of the communication layout.<br>22. continuity of the route.<br>23. Location of interior fixtures (whether they present a barrier/obstacle).<br>24. Access to student lockers for storing private belongings.<br>25. Access to visual information indicating the function of the room (clear pictograms, high contrast).<br>26. Access to information about the function of the room in Braille.<br>27. Visible markings on glazing to spot an obstruction.<br>28. Size and method of opening doors.<br>29. Maneuvering space at the door.<br>30. The location and shape of the door handle.<br>31. The path from the door to the workstation (desk).<br>32. maneuvering space at the workstation (desk).<br>33. Availability of electrical system, access control devices, and lighting service.<br>34. lighting of the room.<br>35. Access for comfortable viewing of presentations on the screen. |

## 2. Results

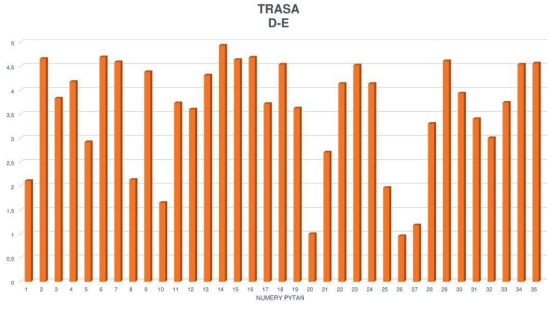
Results presented on charts (ill. 5, 6,), concerning each route section individually, illustrated the most significant issues regarding the accessibility of the building based on the conducted survey. From the C-D chart, it can be inferred that the path between the restroom for people with disabilities and the Dean's Office of the Faculty of Architecture is comfortable and equipped with ample maneuvering space. The weakest aspect of this area is the lack of visible information from a distance regarding directions and functions of rooms, as well as the absence of markings for blind or visually impaired persons on the floor, such as raised elements, and a lack of information in Braille.

From the D-E chart, it can be deduced that the path between the Dean's Office of the Faculty of Architecture and the lecture hall located on a higher floor is functional and entirely sufficient in terms of width and maneuvering spaces. The arrangement of furniture, however, impeded passage through the corridor. Furniture with improperly high tabletops hindered the use of accessible tables. A negative aspect of this space is also the absence of information regarding directions and visible descriptions of room functions from a distance. Additionally, there is a lack of signage for blind or visually impaired persons in the form of tactile paths or raised elements on the floor.

Ill. 5. Audit results from route C-D, compiled by B. Linowiecka




Ill. 6. Audit results from route D-E, compiled by B. Linowiecka




## 3. Discussion

Simulated *disability sensitization* workshop for designers, during which students from the Faculty of Architecture examined selected aspects of accessibility, served as a starting point for studies on this issue. (Ujma-Wąsowicz, Benek, Kempka, 2021) and (Benek, 2022). They contributed to the formulation of original conclusions and continue to shape ongoing design proposals. The experiences presented –both positive and negative – encountered difficulties and limitations, resulting in conscious choices in the design scope, implemented in a multi-family residential building in Milan. The discussion on the strengths and weaknesses of the analyzed space, which took place after the accessibility workshops, set the direction for design improvements.

One of the significant conclusions from the research on the WAiWIZ building was the accidental placement of furniture and non-adapted ergonomic solutions for equipment elements (including furniture). Hence, the negative perception of space fragments by respondents. Furniture often served as a barrier, causing trips and collisions. Chaotically arranged in the lobby, they blocked passages, causing frustration. In response to these experiences, students in apartment projects paid special attention to furniture solutions, proposing:

1. Using a limited amount of furniture but integrating them visually well.
2. Quantitative dominance of fixed furniture, fixed or permanently placed against walls, reducing visual chaos and rearrangements.
3. Introducing rounded, fluid shapes, and low furniture adapted to the height of a wheelchair.
4. Introducing furniture that is easy to transfer to from


Ill.. 7. Student designs for organizational and furniture solutions in residential interiors. A-bathroom detail, B/E-bedroom with integrated handle, C-furniture with low-lying storage space between the entrance hall and living room, D-an upholstered bench to facilitate transfer from a wheelchair, F-kitchen with maneuvering space under the countertop. Source: design teams Chodzyńska A., Dulowska N., Kupsik N., Jurysta A., Aleksanyan M., Dubińska P., Majkowska W., Śnioszek J. under the direction of A. Bonenberg, B. Linowiecka. The project charts represent.

a wheelchair or furniture elements that can serve as support (e.g., using a bed frame with appropriate parameters for easier wheelchair transfer),
5. Locating storage spaces low, making them accessible and within sight,
6. Strictly introducing tables and countertops that accommodate the user's wheelchair knees,
7. Implementing systems that allow the utilization of high storage spaces (wardrobes with modern storage systems featuring lowering rods, a storage system equipped with pantographs).

During the accessibility study, open and maneuverable spaces were very positively perceived, providing continuity and smooth mobility. These communication areas were described as friendly and safe, with no slips or accidents occurring during the study. A separate group consisted of individuals moving as blind – the lack of changes in floor texture along walls, ramps, and elevators made it difficult for them to perform tasks. These conclusions inspired students to design apartments:

1. Maneuvering zones were incorporated into the open functional-spatial layout of the apartment and wide communication paths, as well as spaces for wheelchair maneuvering (with dimensions of 150 cm by 150 cm).
2. Elimination of all thresholds, and leveling floors in all rooms.
3. Introduction of finishing materials for floors with high anti-slip class and varied textures.
4. Contrast of the color scheme to facilitate orientation for individuals with low vision.

In the study, the functioning of the doors to rooms in the WAiWIZ building was unequivocally negatively assessed. They were described as heavy and difficult to open. In the developed apartment project, widening door openings and introducing sliding doors recessed into the wall were proposed. The level of toilet solutions in the WAiWIZ building was highly praised. Students used them as a model for their design proposals. As a result of the conducted experiments, discussions, and based on the literature, the restrooms were equipped with handrails, handles, appropriate toilet bowls, and sinks, suspended at the right height (Kowalski, K., 2018). The conclusions also proposed the introduction of an additional, appropriately equipped toilet in the private area of the apartment. Despite the high assessment of the quality of lighting in the WAiWIZ building where the workshop took place, it was recognized that intimate, diverse interiors of apartments must follow completely different principles.

In summary, the experience of simulated *disability sensitization* training for designers through simulated disability has brought forth original design solutions presented in the illustrations. It has also provided a unique experience for young designers.

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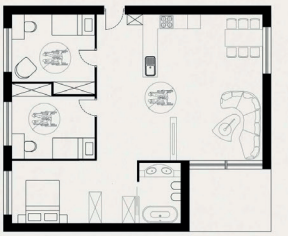
# UNIVERSAL APARTMENT DESIGN IN MILAN, ITALY

Projektowane mieszkanie dedykowane jest rodzinie czteroosobowej, w której jedno z dzieci porusza się na wózku inwalidzkim. Podwyższony standard mieszkania został uzyskany dzięki zastosowaniu wysokiej jakości, ekskluzywnych materiałów oraz nowoczesnych rozwiązań.



RZUT SKALA 1:100

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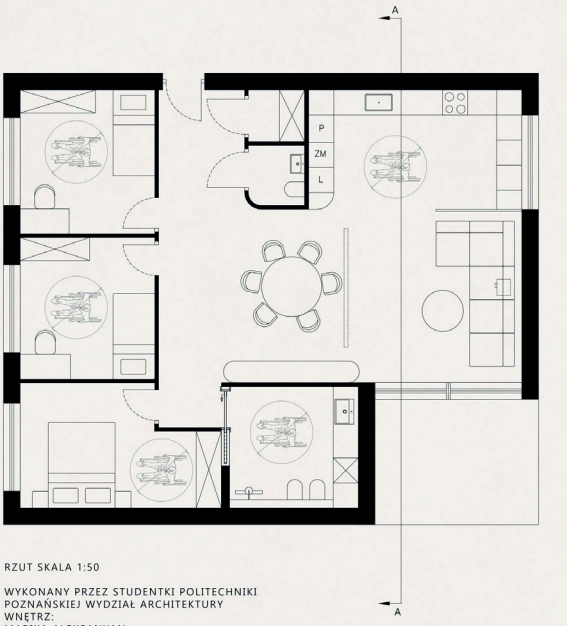
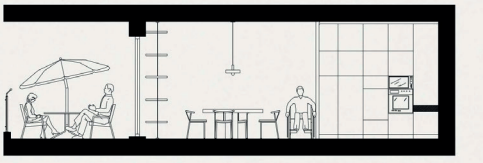
MONIKA PRZYBYŁO
VERA TASKAYA




RZUT SKALA 1:50

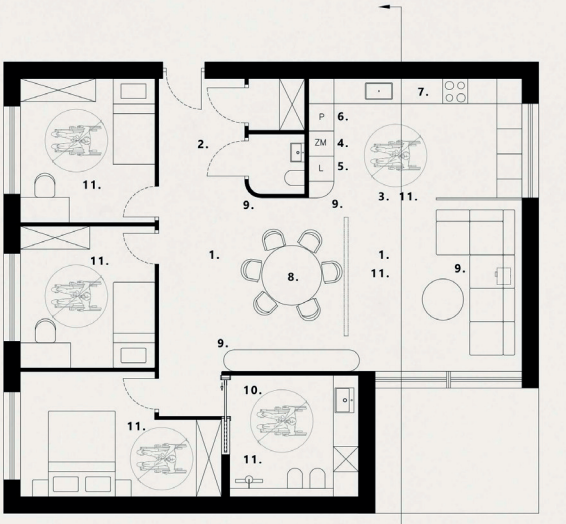
WYKONANY PRZEZ STUDENTKI POLITECHNIKI POZNAŃSKIEJ WYDZIAŁ ARCHITEKTURY WNĘTRZ:
MARIKA ALEKSANYAN
PATRYCJA DUBIŃSKA



PRZEKRÓJ A-A SKALA 1:50

Patrycja Dubińska, Marika Aleksanyan | Przedmiot: ERGONOMIA I KSZTAŁTOWANIE WNĘTRZ OSÓB STARSZYCH I NIEPEŁNOSPRAWNYCH 1 *Faculty: ERGONOMICS AND INTERIOR DESIGN FOR THE ELDERLY AND PERSONS WITH DISABILITEIS 1* | sem. I | rok 1 | studia II stopnia | Prowadzący: Prof. dr hab. inż. arch. Agata Bonenberg, Dr Barbara Linowiecka, Prof. Marco Lucchini
*Project developed within Collaborative Classes Program with Politecnico di Milano*

Elementy wspomagające mobilność w mieszkaniu to:
**1.**Jednolita posadzka- brak progów utrudniających poruszanie się na wózku inwalidzkim
**2.**Szeroki korytarz umożliwiający swobodne poruszanie się osobie na wózku inwalidzkim
**3.**Otwarta przestrzeń
**4.**Zmywarka znajdująca się na wysokości 40 cm od posadzki, co ułatwia korzystanie osobie niepełnosprawnej
**5.**Lodówka na wysokości do 150 cm, pozwalająca na korzystanie z każdej z półek os.Niep.
**6.**Piekarnik na wysokości 60 cm od posadzki ułatwiający korzystanie os.Niep.
**7.**Ruchomy blat umieszczony na szynach z regulacją wysokości od 70cm do 90 cm dostosowany do wysokości strefy roboczej w kuchni każdemu z domowników
**8.**Okrągły stół, który pozwala osobie z niepełnosprawnością podjechać z każdej strony
**9.**Obłe kształty mebli i wyposażenia zmniejszają ryzyko obicia czy zahaczenia przez osobę poruszającą się na wózku
**10.**Duża łazienka z dostosowaniami
**11.**Możliwość wykonania swobodnego obrotu przez osobę na wózku w każdym z pomieszczeń

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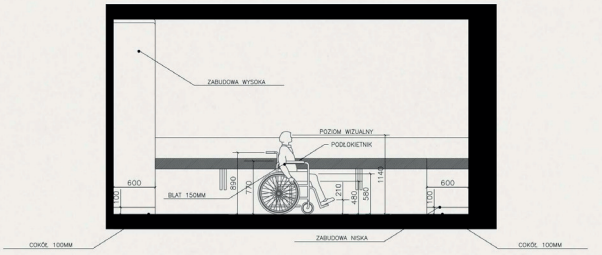


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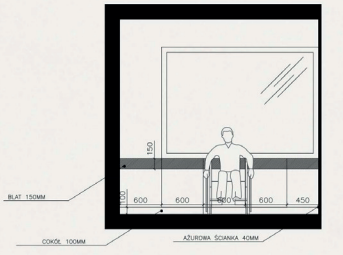


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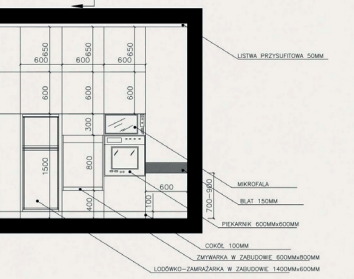


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*Project developed within Collaborative Classes Program with Politecnico di Milano*

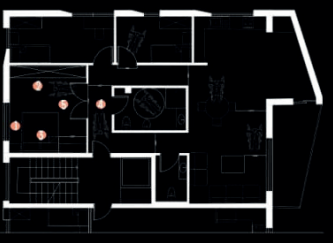



# MIESZKANIE DLA OSOBY PORUSZAJĄCEJ SIĘ NA WÓZKU INWALIDZKIM

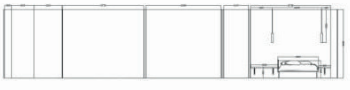
Prezentowany projekt przedstawia owoc współpracy ze studentkami Politechniki w Mediolanie. Mieszkanie stworzone przez mediolanskie studentki zostało przystosowane do potrzeb osoby niepełnosprawnej - na wózku. Widoczna na wizualizacjach sypialnia została dostosowana do osób niepełnosprawnych, a utrzymana jest w stonowanej kolorystyce oraz w duchu stylu japandi.
Pomieszczenie miało byc minimalistyczne, przytulne oraz funkcjonalne.

Dla skali oraz uwiarygodnienia wizualizacji w sypialni został umieszczony wózek. W pomieszczeniu została przemyslana jego wielkosc ze wzgledu na miejsce do przebrania sie i dostep do łóżka oraz szafy.
Ponizej przedstawione soztały rzuty mieszkania oraz przekroje w skali 1:100.

Ponizej w punktach zostana wymienione udogodnienia dla osób niepełnosprawnych jakie zostały wprowadzone w prezentowanym projekcie mieszkania.
1. Drzwi rozsuwane w całym mieszkaniu, aby ułatwic osobie na wózku dostanie sie do danego pomieszczenia.
2. Posadzka wykonana z lastryko lub terazzo, które jest antyposlizgowe oraz odpowiedniej klasy scieralnosci.
3. W łazience prysznic bez brodzika zamiast wanny.
4. Barierkia oraz uchwyt przy toalecie, aby umozliwic korzystanie z niej.
5. Szerokosc korytarza wystarczajaca, aby osoba na wozku mogła swobodnie przejechac.
6. Przy łozku mobilna barierka, która umozliwia przedostanie sie z wozka na łóżko i odwrotnie.
7. Szafka nocna stanowiaca blat umozliwia osobie niepełnosprawnej podjechanie do niej maksymalnie blisko i korzystanie z niej.
8. Wolna przestrzen obok łóżka ułatwia samodzielne przebieranie sie.
9. Kuchnia bez zabudowy do ziemi, aby osoba na wozku mogła korzystac w pełni z blatu kuchennego.
10. Stół jadalniany wyposazony w jedno krzesło mniej, aby osoba niepełnosprawna mogła swobodnie go uzytkowac.
11. Wolna przestrzen obok kanapy pozwala na przemieszczenie sie na nia z wózka lub umiejscowienie wozka przy stoliku kawowym blisko towarzystwa.
12. Lazienka z toaleta przystosowana do osob niepełnosprawnych umiejscowiona została na przeciwko sypialni.



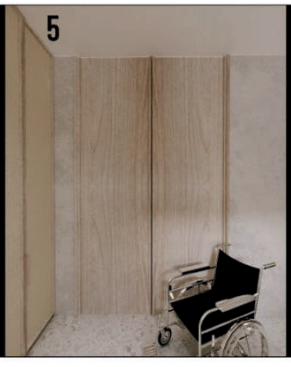
PRZEKRÓJ MIESZKANIA W SKALI 1:100



PRZEKRÓJ MIESZKANIA W SKALI 1:100


Mieszkanie dzieki utrzymaniu w minimalistycznej stylistyce wymaga precyzji wykonania oraz dobrej jakosci produktów. Oznacza to mniej więcej tyle co nieco wiekszy koszt wykonania projektu przez co jest ono osiagalne dla osob srednio zamoznych. Przy realizacji projektu z tanszymi zamiennikami efekt moze nie byc zadowalajacy lub nie spelni okreslonych wyzej udogodnien. Dzieki zastosowaniu naturalnych materiałów o wysokiej jakosci zyskuje sie guarancje wieloletniej wytrzymalosci i wieloletniosci.


Wiekszosc materiałów wykorzystanych w projekcie mieszkania jest przyjazne dla srodowiska oraz naturalne. Zdecydowanie króluje drewno, rattan czy metal, który jest zazwyczaj w ponad 90% recyklingowalny. Na posadzce widoczne jest lastryko lub terazzo, które wykonywane jest z resztek kamieni, a przy tym jest antyposlizgowe co zmniejsza ryzyko upadku.




PRZEDMIOT : ERGONOMIA I KSZTAŁTOWANIE WNETRZ OSÓB STARSZYCH I NIEPEŁNOSPRAWNYCH I
SEMESTR I, ROK I, STUDIA II STOPNIA
KIERUNEK : ARCHITEKTURA WNETRZ, WYDZIAŁ ARCHITEKTURY POLITECHNIKI POZNANSKIEJ

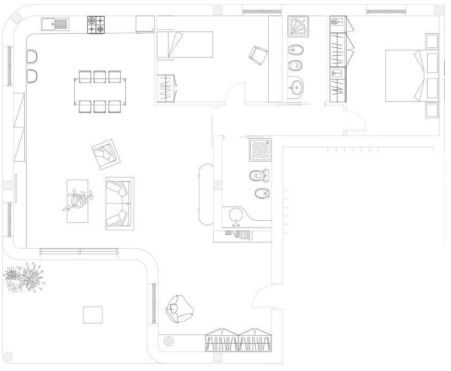
AUTORKI: WERONIKA MAJKOWSKA, JOLANTA ŚSNIOSZEK
PROWADZACE : PROF. DR HAB. INZ. ARCH. AGATA BONENBERG,
DR INZ. ARCH. BARBARA LINOWIECKA
PROF. DR HAB. INZ. ARCH. MARCO LUCCHINI

POLITECNICO MILANO 1863

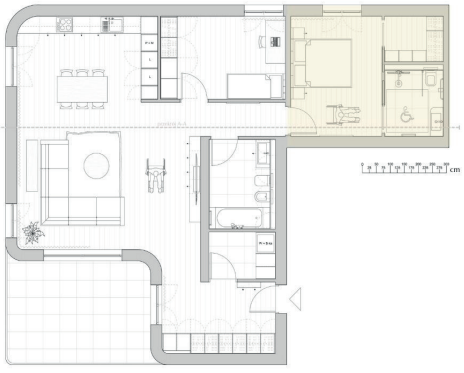
# ERGONOMIA I KSZTAŁTOWANIE WNĘTRZ OSÓB STARSZYCH I NIEPEŁNOSPRAWNYCH

Mieszkanie dedykowane jest rodzinie, składającej się z pary rodziców oraz jednego dziecka w wieku nastoletnim. Jedno z rodziców jest osobą z niepełnosprawnością i porusza się na wózku. Projekt przewiduje realizację mieszkania w wysokim standardzie wykończenia.

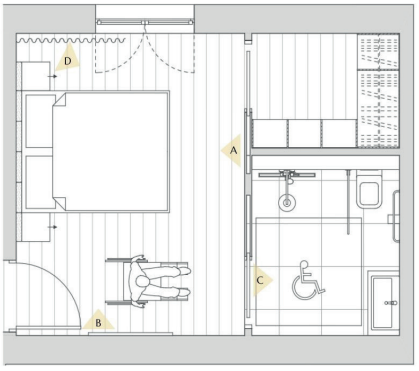
Wnętrza zostały zaprojektowane w stylu nowoczesnym, minimalistycznym, jednak bardzo przytulnym. Ważną rolę odgrywa naturalna i ciepła gama kolorystyczna z przewagą szarości, spójna dla wszystkich pomieszczeń. Materiały zastosowane w projekcie są odważne, jak na przykład czarno-białe lastryko w toalecie, jednak znakomicie dopełniające się z innymi elementami wnętrza. Wykończenia zostały starannie dobrane, nie tylko pod względem estetycznym, ale również biorąc pod uwagę kwestie bezpieczeństwa, np. klasę antypoślizgowości podłogi. Motywem powtarzającym się w każdym pokoju są geometryczne kształty, które można zauważyć we wzorze tapety na jednej ze ścian w sypialni oraz w detalach dekoracyjnych. Eleganckie oraz minimalistyczne oprawy świetlne stanowią duży walor estetyczny, dodając przytulnego klimatu. Pomimo stosunkowo ciemnej tonacji kolorystycznej użytkownik nie czuje się przytłoczony we wnętrzu. Ze względu na odpowiednią kompozycję, zastosowanie rozmaitych faktur i tekstur oraz dostateczną ilość źródeł światła przestrzeń wydaje się być interesującym miejscem do życia dla rodziny ze szczególnymi potrzebami.



Pierwotna wersja układu funkcjonalnego



Poprawiony układ funkcjonalny - dostosowany do potrzeb osób z niepełnosprawnościami




Rzut pokoju z garderobą i dostępną toaletą

W mieszkaniu wprowadzono kilka istotnych zmian, mających na celu dostosowanie go do potrzeb osoby dorosłej, poruszającej się na wózku. W strefie wejściowej dodano pojemne, robione na zamówienie szafy. Dodatkowo powstała wygodna pralnia z wejściem od korytarza. Przestrzeń komunikacyjna została zmniejszona, jednak pozostała funkcjonalna i o odpowiednich parametrach. Strefa dzienna wyposażona została w dużą kanapę i stół jadalniany. Kuchnia przystosowana została do osoby z niepełnosprawnościami. W strefie prywatnej zagospodarowano przestronny pokój sypialniany z dostępną garderobą i toaletą.

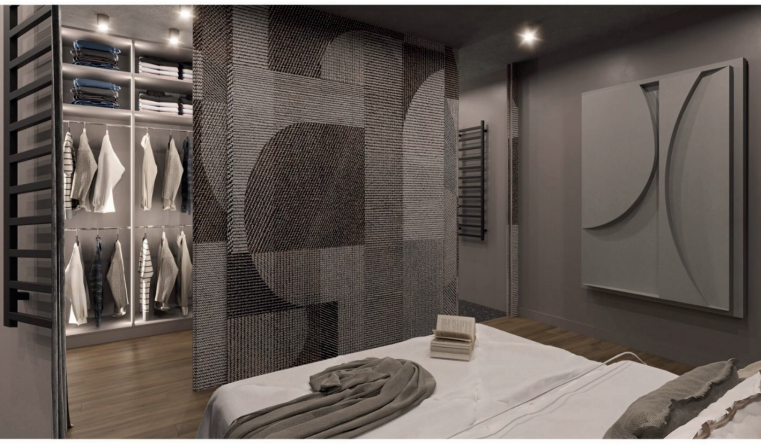
Wizualizacja - sypialnia, widok na ścianę wejściową (widok A)

Wizualizacja - sypialnia, widok na ścianę zewnętrzną z oknem (widok B)

## ELEMENTY PROJEKTOWE, WSPOMAGAJĄCE MOBILNOŚĆ W MIESZKANIU:

1. szerokie ścieżki komunikacyjne oraz miejsca do swobodnego manewrowania wózkiem (o wymiarach 150 cm na 150 cm),
2. likwidacja wszelkich progów, wyrównanie wysokości posadzki w każdym pomieszczeniu,
3. wprowadzenie podłogi o wysokiej klasie antypoślizgowości,
4. poszerzenie otworów drzwiowych dla wygodnego przejazdu wózkiem i zastosowanie drzwi przesuwnych, chowanych w ścianie,
5. zastosowanie w kuchni udogodnień dla osób z ograniczonym zakresem ruchowym,
6. stworzenie dedykowanej dostępnej toalety w strefie prywatnej mieszkania,
7. sanitariat wyposażony w poręcze i uchwyty, dostosowana miska WC i umywalka, zawieszone na odpowiedniej wysokości,
8. garderoba z nowoczesnymi systemami przechowywania z opuszczanymi drążkami
9. wygodne uchwyty z garderobie dla lepszego wspomagania przy użytkowaniu,
10. zastosowanie ramy łóżka, o odpowiednich parametrach, dla łatwiejszego przesiadania się z wózka;

Wizualizacja - toaleta dostosowana do osoby z niepełnosprawnością (widok C)



Wizualizacja - sypialnia, widok na ścianę dekoracyjną z drzwiami do garderoby i toalety (widok D)

AUTORKI: ADRIANA CHODZYŃSKA I NATALIA DULOWSKA | PRZEDMIOT: ERGONOMIA I KSZTAŁTOWANIE WNĘTRZ OSÓB STARSZYCH I NIEPEŁNOSPRAWNYCH I
ERGONOMICS AND INTERIOR DESIGN FOR THE ELDERLY AND PERSONS WITH DISABILITEIS I | ARCHITEKTURA WNĘTRZ - I SEMESTR II STOPIEŃ |
PROWADZĄCY: PROF. DR HAB. INŻ. ARCH. AGATA BONENBERG, DR BARBARA LINOWIECKA, PROF. MARCO LUCCHINI
PROJECT DEVELOPED WITHIN COLLABORATIVE CLASSES PROGRAM WITH POLITECNICO DI MILANO

# UNIVERSAL APARTMENT DESIGN IN MILAN ITALY

Project is dedicated to a person with a movement disability which moves thanks to a wheelchair. Presented conception reaches the average living standard.


A entrance area view


B Kitchenette view

15 living room equipped with a handle to provide save transfer from a wheelchair to sofa

16 store system with pantograph to facilitate getting cloths from a higher height

17 low furniture, accessible from wheelchair with oval shapes to facilitate moving around the apartment

14 bathroom equipment suited to person with disabilities needs (mirror mounted on angle of 20 degrees, washbasin which allows to operate under in a wheelchair, toilet bowl on 50 cm height with tilt-able railings and spacious shower

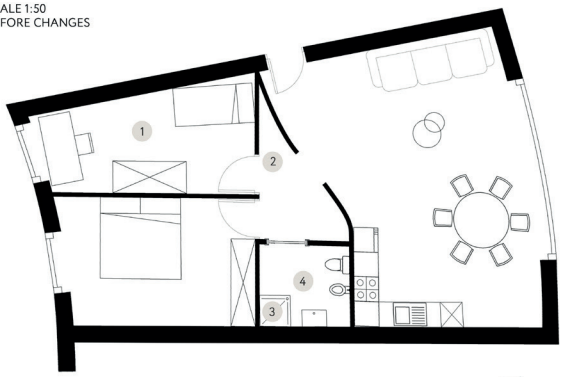
SCALE 1:50
BEFORE CHANGES

1 too narrow corridor

2 accessible narrow space in the corners

3 small bathroom with tiny shower

4 maladjusted bathroom for a person in a wheelchair, lack of space to turn around for a wheelchair to turn around




5 90 cm width doors without threshold

6 cupboards and shelves mounted up to a maximum high of 120 cm

7 wide 90 cm corridor comfortable for a wheelchair

8 adjusted kitchen furniture- easy access to sink and induction hob

9 non-slip floors facilitate to move around the apartment

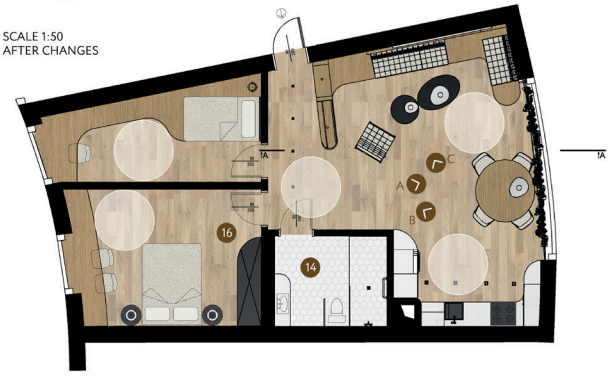
10 hidden tv cabinet

11 adjusted parameters of all handles (L shape) mounted on a proper height (90 cm)

12 no thresholds and barriers on the way

13 smart control over lightning and blinds

SCALE 1:50
AFTER CHANGES




A - A

INTERSECTION SCALE 1:50

c living room view


Aleksandra Kupsik, Anna Jurysta; Ergonomia i kształtowanie wnętrz osób starszych i niepełnosprawnych 1;
Ergonomics and interior design for elderly and people with disabilities; semestr I, rok I, stopień II
Prowadzący: prof. dr hab. inż. arch. Agata Bonenberg, dr Barbara Linowiecka, prof. Marco Lucchini
Project developed within Collaborative Classes Program with Politecnico di Milano

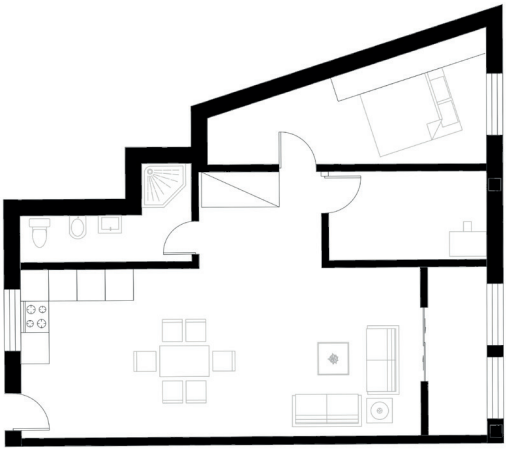
POLITECNICO MILANO 1863 · AWWA PP · Architektura wnętrz

# UNIVERSAL APARTMENT DESIGN

## Milan in Italy

### BEFORE

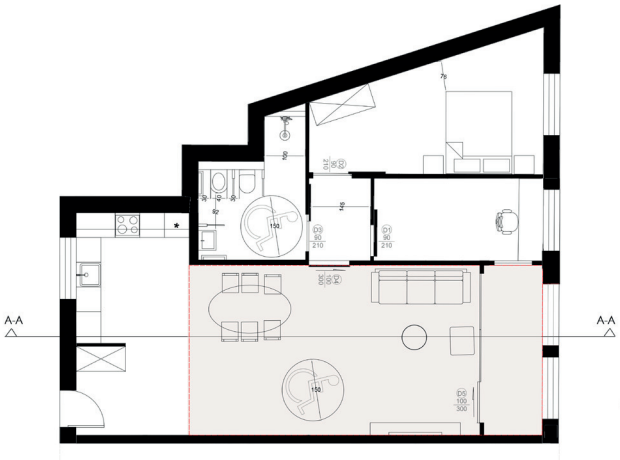
Pierwotny układ funkcjonalny
wykonany przez studentów Pilitechnico Milano



RZUT I
Skala 1:50

### AFTER

Mieszkanie dostosowane dla osoby z niepełnosprawnością
wykonany przez studentów Politechniki Poznańskiej




RZUT II
Skala 1:50

### ROZWIĄZANIA WSPOMAGAJĄCE MOBILNOŚĆ

I. otwory drzwiowe min. 90 cm w świetle ościeżnicy.

II. przestrzeń do manawru wózkiem o śr. 150 cm.

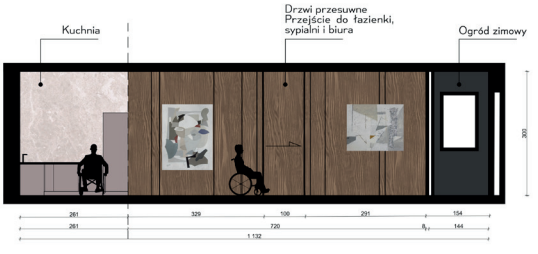
III. zastosowanie drzwi przesuwnych.

IV. obłe kształty mebli, zmniejszają ryzyko uderzeń.

V. dostosowanie łazienki dla osób z niepełnosprawnością ruchową

WIZUALIZACJA- Widok na ogród zimowy

PRZEKRÓJ A-A
Skala 1:50




### PROJEKT POKOJU DZIENNEGO Z OGRODEM ZIMOWYM

Celem projektu było stworzenie przestrzeni bez barier, dostosowaną dla osób z niepełosprawnością ruchową.
Głównym elementem jest ściana pokryta drewnem z ukrytymi drzwiami przesuwnymi, prowadzącymi do dalszej części mieszkania.
W lokalu zaprojektowano ogród zimowy, który przede wszystkim pełni rolę terapeutyczną, jak i również ozdobną.

Dorota Gauza , Gabriela Puławska, Architektura Wnętrz, sem. I, stopień II
Prowadzący: Prof. dr hab. inż. arch. Agata Bonenberg, Dr Barbara Linowiecka,
Prof. Marco Lucchini

ERGONIMIA I KSZTAŁTOWANIE WNĘTRZ OSÓB STARSZYCH I NIEPEŁNOSPRAWNYCH
ERGONOMICS AND INTERIOR DESIGN FOR THE ELDERLY AND PERSONS WITH DISABILITEIS

Project developed within Collaborative Classes
Program with Politecnico di Milano

AWWA PP Architektura Wnętrz Wydział Architektury Politechniki Poznańskiej
POLITECNICO MILANO 1863
Collaborative Classes INTERNATIONAL COLLABORATIVE TEACHING