Physical Accessibility

Foreword

This handbook is one in a series of handbooks entitled *Students with Disabilities* created as part of the TEMPUS project Education for Equal Opportunities at Croatian Universities – EduQuality (Nr: 158757-TEMPUS-1-2009-1-HR-TEMPUS-JPGR) led by the University of Zagreb.

The series aims at equalizing the opportunities of students with disabilities to access higher education by informing, training and raising awareness of the academic and non-academic staff at Croatian universities and their constituents with regard to the specific needs of such students within Croatia's higher education system.

We consider students with disabilities to include students with vision and hearing impairments, motor impairment, chronic disease and learning difficulties such as dyslexia and ADHD, as well as students with mental disturbances and disorders. By categorizing these students as students with disabilities our intention is by no means to stigmatize or brand them, but rather to emphasize the need for accommodation of academic content to such students, as well as to present some examples of good practice.

The handbooks were written by members of all partner institutions in the project: the academic and non-academic staff of the University of Zagreb, Josip Juraj Strossmayer University in Osijek and the Universities of Rijeka, Zadar, Split and Dubrovnik; students with and without disabilities; and a representative of Croatia's Institute for the Development of Education. Particularly invaluable was the help we received from our colleagues from partner institutions abroad (the University of Århus, Masaryk University, the University of Strathclyde and the University of Gothenburg), who offered concrete advice and guidelines based on their vast experience in supporting students with disabilities.

Each handbook covers an important aspect of students' academic life, defining it and explaining its importance with regard to the acquisition of necessary professional competences. At the same time, the handbooks point to some obstacles that can exist with regard to accessibility, in an attempt to identify the preconditions for overcoming such obstacles without compromising the defined academic standards. By emphasizing the rights of all students to equal access to higher education and by proposing measures that can

equalize opportunities, often in a simple way and at no additional cost, these handbooks aim at contributing to the definition of clear accessibility standards for students with disabilities at the national level.

I would like to use this opportunity to thank all the contributors who took part, either directly or indirectly, in the creation of these handbooks. I am particularly grateful to former, current and future students with disabilities who have used and will continue to use their perseverance, courage, patience and great motivation to build the much-needed support system for students with disabilities in Croatia's higher education by pointing out their specific needs and simple ways in which these needs can be met. However, their efforts would continue to be in vain if it had not been for a large number of academic and non-academic staff members who have provided support to students with disabilities in practice, often without the existence of clear guidelines and relying only on their empathy and wish to improve the situation. I believe that these handbooks will provide them with clear and systematic guidelines that will facilitate their future work.

Dr. Lelia Kiš-Glavaš, Project Leader

NOTE:

This handbook was translated from Croatian into English by the following graduate students of translation in the English Department of the University of Zagreb: Marija Rosandić, Hrvoje Ryznar, Maja Šarac and Vivijana Vidas. The translation was revised by their teacher, Dr. Nataša Pavlović. There may be minor differences between this translation and the final Croatian version of the handbook.

Contents

Introduction

This handbook, entitled Physical Accessibility, is the second in the series of handbooks resulting from the TEMPUS project Education for Equal Opportunities at Croatian Universities (EduQuality). The authors include administrative university staff (Damir Španić and Zrinka Udiljak-Bugarinovski), a university teacher (Nataša Pavlović) and students (Asja Barić, Ivan Dolanc and Elizabeta Haničar).

The handbook deals with physical accessibility, in particular with architectural barriers, regulations related to physical accessibility, possible solutions, and the notion of universal design. It stresses the importance of physical accessibility for students with disabilities and attempts to answer the question of what makes an environment accessible, providing illustrative examples from practice, suggesting methods for the assessment of physical accessibility and offering solutions, all with the aim of including the largest possible number of students with disabilities in the system of higher education and improving the quality of education. The Appendix contains a check-list for the assessment of physical accessibility, whose purpose is to identify the existing architectural and other barriers and offer solutions aimed at ensuring physical accessibility. Accommodations are often possible with simple solutions that do not require great expenditures.

Accessibility refers to everything that enables students with disabilities to live independently and participate in all aspects of life on an equal footing with others (Počuč 2008). Physical accessibility is closely related to the notion of architectural barriers, that is, those obstacles that hinder or impede unrestricted access, movement, stay or work (Ordinance Ensuring Access to Buildings for Persons with Disabilities, OG 151/05). They appear when spaces or travel routes become too small or narrow for walking, navigation or maneuvering, or when they are inexistent (http://www.gradimo.hr/3640.aspx).

Physical accessibility has a great impact on the academic and social lives of students with disabilities; in other words, the existing architectural barriers are an obstacle to their full integration in everyday events.

Even when accommodations are implemented, they usually include only those that benefit the students with motor impairments, while the students with visual and hearing impairments are disregarded. What is worse, some accommodations for persons with hearing impairments have yet to be standardized. This handbook takes into consideration the accommodations necessary for all groups of students with disabilities, in order to raise awareness, improve accessibility, and encourage the use of universal design.

The latter term is unavoidable when it comes to physical accessibility. It refers to an interdisciplinary concept of design with high esthetic requirements, encompassing a large number of social groups with all of their specific needs (http://www.gradimo.hr/ 3640.aspx).

Elizabeta Haničar

The Editor

1. Definition of accessibility

(Damir Španić)

Accessibility is the result of the application of technical solutions in design and construction of buildings that provide persons with disabilities and reduced mobility with barrier-free access to, movement around, and use of such buildings on an equal footing with other persons. An accessible building is a building, part of a building or equipment which ensures that all the required elements of accessibility are included (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05). Required elements of accessibility are those elements of design and construction which define the dimensions and characteristics of a building, as well as outlets, fittings, furnishings and other equipment the building should include in order to provide barrier-free access to, movement around, and use of a building for persons with disabilities and reduced mobility on an equal footing with others (ibid.). Accessibility is ensured by selecting the most suitable solution with regard to the purpose and other characteristics of the building. The required elements of accessibility include (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05; Handbook for the Application of the Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, 2006) the following:

a) Elements of accessibility for overcoming height differences;
b) Elements of accessibility for independent living;
c) Elements of accessibility in public transportation.

The following elements of accessibility may be used for the purpose of overcoming height differences along the route of travel of persons with reduced mobility: an accessible ramp, staircase, elevator, vertical platform lift and foldable inclined wheelchair lift.

In order to create conditions for independent living for persons with disabilities and reduced mobility, the following elements of accessibility are used: accessible approach, entrance area, route of travel, toilet, bathroom, kitchen, bedroom, classroom, working space, apartment, bar and restaurant, locker room, shower stall, beach and pool entry point, place in an auditorium, telephone, text telephone, fax machine, ATM, electrical outlet and light switch, door and window handle, teller window, counter, audio frequency induction loop, notice board and ground plan for orientation.

In order to create conditions for independent movement of persons with disabilities and reduced mobility in public transportation, the following elements of accessibility are used: accessible bus or tram stop, platform, parking space, pedestrian space, traffic light, pedestrian crossing, pedestrian island and intersection.

Symbols of accessibility are symbols used to mark the required elements of accessibility (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05). The dimensions and color of each symbol, as well as the material of which it is made, are determined according to the background on which the symbol is placed, the interior and exterior design, and the distance from which persons with motor and visual impairments should be able to see the symbol (Handbook for the Application of the Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, 2006).

Figure 1.1. Access for wheelchair users.

Figure 1.2. Access for blind persons.

Figure 1.3. Access for visually impaired persons.

Figure 1.4. Access for hearing impaired persons.

Figure 1.5. Access for persons using a cane, crutches or a walker.

Figure 1.6. Access for persons who use a white cane and a guide dog.

Figure 1.7. Access for persons with a baby stroller.

Figure 1.8. Accessible ramp.

Figure 1.9. Accessible staircase.

Figure 1.10. Accessible elevator.

Figure 1.11. Vertical platform lift.

Figure 1.12. Foldable inclined wheelchair lift.

Figure 1.13. Accessible entrance area.

Figure 1.14. Accessible toilet.

Figure 1.15. Accessible bathroom or shower stall.

Figure 1.16. Accessible cafeteria or restaurant.

Figure 1.17. Accessible beach and pool point of entry.

Figure 1.18. Accessible telephone.

Figure 1.19. Accessible text telephone, fax machine or ATM.

Figure 1.20. Accessible place in an auditorium.

Figure 1.21. Communication aid.

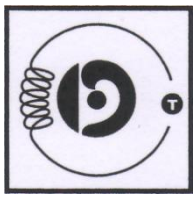

Figure 1.22. Audio frequency induction loop (AFIL).

Figure 1.23. Accessible teller window or counter.

Figure 1.24. Accessible notice board.

Figure 1.25. Accessible parking space.

Figure 1 - The figure shows symbols of accessibility (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG No. 151/05; Handbook for the Application of the Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, 2006).

It is important to note that public and commercial buildings should be designed and constructed in such a way that they contain the required elements of accessibility, depending on their primary purpose. Under the regulations currently in force in Croatia, institutions of higher education should have an accessible entrance, routes of travel, toilets, classrooms and notice boards.

The same elements of accessibility, as well as accessible bathrooms, kitchens and bedrooms, should be included in dormitories with 50 or more rooms with communal sanitary units, and in hotel style dorms with 50 or more rooms with ensuite bathrooms or shower stalls. Apartment style dorms with 50 or more apartments should include accessible apartments (Handbook for the Application of the Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, 2006).

In Croatia, conditions for students with disabilities vary widely from one university to another, and even within a single university. For example, with regard to the buildings housing the constituents of the University of Zagreb, the Faculty of Humanities and Social Sciences is the most accessible (Kiš-Glavaš, Ruškan and Rudić, 2005), while the Rectorate building is the least accessible.

Plans for the construction of the new campuses of the University of Rijeka and the University of Zadar envisage the fulfillment of all accessibility conditions for students with disabilities.

In Split, the Faculty of Philosophy operates on six different locations and only some of them are fully accessible to students with disabilities. The Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, as well as the Faculty of Economics, are relatively accessible to students with disabilities, and the same is true of the Faculty of Kinesiology.

There is a lot of room for improvement at Josip Juraj Strossmayer University in Osijek, where efforts are being made to relocate some of the constituents to the new University campus situated in what used to be military barracks. During this process, special attention is being paid to accessibility. Some faculties (the Faculty of Agriculture, the Faculty of Civil

Engineering, the Department of Chemistry and Biology, the Faculty of Teacher Education), as well as the University Library, will be relocated to new buildings completely accessible for students with disabilities. The University's Office for Students with Disabilities will also be located in the new campus.

It should be noted that administrative boards of faculties and universities are mainly trying to solve problems related to physical barriers, attempting first and foremost to make the facilities accessible to students in wheelchairs. However, they often ignore tactile strips and warning strips for blind students who use white canes. Students in wheelchairs and visually impaired students have difficulties navigating the hallways that were originally accessible, but have subsequently been crammed with desks, chairs or other furniture which constitute physical barriers and impede access. Inaccessible door knobs may also present a problem for students with physical disabilities if ignored when only the overall image of space is focused on.

Figure 2 - An example of bad practice: The photograph shows horizontal barriers (desks) in a university hallway that present obstacles and hinder the movement of blind and visually impaired students.

2. Legislation and regulations

(Damir Španić)

The United Nations Universal Declaration of Human Rights (1948) is recognition of the inherent dignity and of the equal and inalienable rights of all members of the human

family. This principle forms the basis of national and international documents that protect all types of human rights.

The United Nations Convention on the Rights of Persons with Disabilities (2006) is an international document that, taking into account the basic principles that derive from the Universal Declaration of Human Rights (the recognition of the inherent dignity, the freedom of personal choice and the independence of individuals, non-discrimination, gender equality), guarantees the rights arising from disability. Thus, among the general principles, the following obligations are listed: full and effective participation and inclusion in society, respect for difference and acceptance of persons with disabilities as part of human diversity and humanity, equality of opportunity and respect for the evolving capacities of children with disabilities (Convention on the Rights of Persons with Disabilities, 2006).

It is important to emphasize that the signatories of this Convention made a commitment to ensure the implementation of all human rights and fundamental freedoms of all persons with disabilities without any discrimination on the basis of disability. They are obliged to adapt their legislation and take the necessary measures to implement the rights recognized by the Convention. The Convention stipulates practical implementation of fundamental human rights and also their elaboration in the legal instruments so that these rights may be fully exercised by persons with disabilities.

The Convention awards great importance to the taking of appropriate measures to ensure accessibility for persons with disabilities because its goal is to provide persons with disabilities with opportunities for independent living and full participation in all aspects of life. Without accessibility there can be no equal opportunities.

The signatories have therefore made a commitment to take the following measures (Convention on the Rights of Persons with Disabilities, 2006):

a) Implementing the minimum standards and guidelines for the accessibility of facilities and services open or provided to the public;

b) Ensuring that private entities that offer facilities and services which are open or provided to the public take into account all aspects of accessibility;
c) Providing training for stakeholders on accessibility issues facing persons with disabilities;
d) Providing signage in Braille in buildings and other facilities open to the public;
e) Providing personal assistants and intermediaries to facilitate accessibility to buildings and other facilities open to the public;
f) Promoting other appropriate forms of assistance and support to persons with disabilities to ensure their access to information;
g) Promoting access to new technologies;
h) Promoting accessible information and communications technologies and systems at an early stage so that they become accessible at minimum cost.

The Republic of Croatia has incorporated the principles of the Universal Declaration of Human Rights in its legal system, and is a signatory of the Convention on the Rights of Persons with Disabilities. The Convention is the result of continuous and fruitful efforts of people with disabilities in their communities, but also of their activities on the global level. Croatia was among the first 20 countries to sign the Convention on 20 March 2007 (National Strategy to Create Equal Opportunities for Persons with Disabilities 2007-2015, OG, 63/07).

Since the implementation of human rights policy in Croatia stems from the adoption of key international documents, and is reflected in their incorporation into the national legislative framework and their implementation in practice, the Croatian legislature has adopted several documents in order to advance and further strengthen the protection of the rights of persons with disabilities.

The key document is the National Strategy to Create Equal Opportunities for Persons with Disabilities 2007-2015 (OG, 63/07), aimed at harmonizing all policies on the protection of persons with disabilities with the global trends to ensure that all aspects of life are open and accessible to persons with disabilities. This document defines accessibility as one of the basic preconditions for performing the activities of daily living (ADL) of persons with

disabilities and for their inclusion in society (National Strategy to Create Equal Opportunities for Persons with Disabilities 2007-2015, OG, 63/07).

The document emphasizes the accessibility of public transport on all lines, accessible timetables and vehicles, as well as the provision of clear and accessible information at terminals and on board the vehicles. Given that transportation is the basic precondition for achieving equal opportunities, its improvement is planned in accordance with the European standards in order to make the entire transportation system accessible to all persons with disabilities.

The promotion of universal design is one of the most important tasks during the implementation of the Strategy. Its aim is to simplify life for everybody by making the built environment more accessible and understandable.

The objectives of the National Strategy to Create Equal Opportunities for Persons with Disabilities 2007-2015 (OG, 63/07) are the following:

a) To progressively establish an environment accessible to persons with disabilities by applying the principles of universal design, thus avoiding the creation of new barriers;
b) To provide access to transportation for all persons with disabilities;
c) To develop training programs related to the application of universal design;
d) To provide access to information and communications for all persons with disabilities;
e) To ensure the application of modern technologies;
f) To establish a system of assistance for solving housing issues for persons whose disabilities are a result of accidents or sudden illness.

Documents that regulate accessibility in Croatia are the Building Act (OG, 175/03), the Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility (OG, 151/05) and the Protection and Rescue Act (OG, 174/04) (in the field of electronic services for hearing impaired persons). A more detailed review of these acts that define the minimum standards for physical accessibility can be found in Chapter 2.

At the annual assembly of the Association of Cities in the Republic of Croatia held on 9 February 2011, the mayors of 19 cities signed the Mobility Charter for Improving Access to Public Buildings for Persons with Disabilities, bringing the number of signatory cities to 80. In this way the mayors expressed their commitment to removing the existing physical barriers and promoting the accessibility of public facilities for persons with disabilities (http://www.r-1.hr/potpisana_povelja_o_pristupacnosti_javnim_prostora_osobama_s_invaliditetom/37902_4).

Finally, the University of Zagreb is one of the 42 members of the Network of Universities from the Capitals of Europe (UNICA), a network of universities which has over 120,000 employees and 1,500,000 students. In an attempt to ensure equal opportunities, UNICA members have adopted a document in the form of recommendations for minimum standards for persons with disabilities at UNICA universities. The achievement of the following minimum standards, the first and the fourth of which refer to accessibility, is a guarantee of ensuring equal opportunities (Minimum Standards for Disabled Persons for UNICA Universities, 2008):

- The needs of disabled persons (both students and staff) are considered in all strategic plans of the institution;
- The university has an official document/statement on equal rights, which specifically describes the university policy and procedures concerning persons with disabilities;
- The university has a specialist service for persons with disabilities, or at least one full time employee with responsibility for coordinating services;
- The university develops clear criteria of eligibility for services and accommodations;
- The university applies the same standards in the assessment of all students, disabled or not;
- Students with disabilities have the same choice of study programs as non disabled students;
- The university ensures the protection of information concerning the disability or health of an individual and treats it as confidential;

- The university promotes disability awareness among students and staff;
- The university provides disability training for its staff (teaching and administrative).

As can be seen, the rights of students with disabilities are guaranteed on paper, as are the minimum standards defined by various laws and regulations. However, further efforts are needed to raise awareness among the wider academic community of the needs of students with disabilities. Additional effort should be made to transpose the minimum standards for physical accessibility from the documents to the actual everyday environment in order to integrate students with disabilities in the academic community.

Despite the good intentions to make accommodations to the existing, and construct accessible new buildings, the expression "students with disabilities" is too often identified with students in wheelchairs, while other types of disability are disregarded. Frequently, only the overall image of a building is taken into account so that the regulations are met on paper, while the actual range of difficulties which students with disabilities face every day is neglected. A building which has a ramp and an elevator can hardly be described as fully accessible if some of the classrooms or a particular area of the classroom are inaccessible. In order to achieve the required accessibility standards in the actual environment, decision-makers should consult not only the rules and regulations, but also the students with disabilities themselves.

3. Academic environment accessible for students with disabilities

(Elizabeta Haničar)

The Convention on the Rights of Persons with Disabilities (2006) promotes the freedom of choice and points to the necessity of enabling effective participation of persons with disabilities in a free society, based on reasonable accommodations and the needs of individuals. The United Nations Standard Rules on the Equalization of Opportunities for Persons with Disabilities (1993) state the necessity to take action to equalize opportunities. By recognizing the importance of access to physical, social, economic and cultural

environments and to education, information and communication, persons with disabilities are provided with the opportunity to exercise all human rights and fundamental freedoms (Convention on the Rights of Persons with Disabilities, 2006). This grants students with disabilities the right to equal and quality education in the community where they live, and access to effective participation and inclusion in society (Convention on the Rights of Persons with Disabilities, 2006). In this way, they are not discriminated against but rather respect is shown for differences. Disabilities are accepted as an aspect of human diversity and humanity, encouraging equal opportunities (Convention on the Rights of Persons with Disabilities, 2006). The Anti-Discrimination Act (OG, 85/08) stipulates protection against discrimination on the basis of disability. Failure to enable persons with disabilities to participate in public and social life in accordance with their needs is considered discrimination (Convention on the Rights of Persons with Disabilities, 2006). Discrimination against any person on the basis of disability is a violation of the inherent dignity and worth of the human person (Convention on the Rights of Persons with Disabilities, 2006).

Living conditions and environmental influences to which a person is exposed significantly affect the quality of life. Quality of life indicators for students with disabilities are consistent with the generally accepted quality of life aspects, which include physical, material and emotional well-being, personal development, self-determination, interpersonal relationships, social inclusion and the exercise of rights. Physical well-being refers to mobility, recreation, leisure, daily activities, etc. Interpersonal relationships include, among other things, interaction, friendships and support, while social inclusion refers to social integration and participation, support and social roles. Personal development refers to education, skills, accomplishments, personal competences and achievements (Bratković, 2002). Physical well-being, interpersonal relationships, personal development and social inclusion are further discussed in the text below.

Research conducted at the University of Zagreb, more specifically in the dormitories “Cvjetno naselje”, “Ante Starčević” and “Ivan Meštrović”, as a part of a graduation project indicates satisfaction with the quality of life in general, with the life in the dormitory and with the education (Franulović, 2009).

For students with disabilities, mobility means not only establishing relations in space and time, but it is also an important precondition for achieving independence and establishing social contacts (National Strategy of Uniform Policies for Persons with Disabilities 2003-2006, OG, 13/03). In other words, it is a precondition for integration (Fejzić, 2007) in everyday life. In present conditions, the built environment often excludes students with disabilities rather than include them. Too often they are not understood by the community, which prevents them from moving around freely and independently, thus hindering communication, education, work, enjoyment in cultural and social life and sports activities. The use of material and cultural goods, that is, equal participation in all aspects of life, is generally difficult, and often impossible. Students with disabilities are thus pushed outside the society and are prevented from participating in social events. It is beneficial for any social community to make additional investments in construction (Fejzić, 2007), enabling equal participation for everyone. To that end, the National Strategy to Create Equal Opportunities for Persons with Disabilities 2007-2015 (OG, 63/07) identifies measures aimed at ensuring infrastructural support for children with developmental delay, access to buildings for persons with disabilities and reduced mobility, the use of assistive technology to improve the mobility of persons with disabilities, as well as specific budget allocations for removing architectural and other barriers. The measures are also aimed at encouraging the development of universal design and ensuring various forms of assistance for persons with disabilities in the area of communication.

Friendship and other social relationships have great importance in people's lives. Students with disabilities often face a lack of understanding and acceptance by the social community. The study conducted by Franulović (2009) indicates that students with disabilities are dissatisfied with social interaction and entertainment in dormitories. Positive attitudes towards persons with disabilities result from direct contact with such persons (Leutar, Štambuk, 2006). The study conducted by Leutar and Štambuk (2006) shows that the experience in dealing with people with disabilities reduces discomfort and insecurity in interaction, changing the stereotypes and bringing about more favorable attitudes. The introduction of different forms of socialization and integration programs increases the chance that people will overcome their "fear" of persons with disabilities. Closer contacts should encourage and strengthen friendships between the groups and thus change the

attitudes (Leutar, 2003; cited in Leutar and Štambuk, 2006). All this encourages the need for stronger interaction and mutual acquaintance, both in the academic environment and through general interaction in the spare time.

The inclusion of students with disabilities in the education process and the study of their attitudes are prerequisites for achieving a certain level of quality (Sinković, Sinković, 2008). In science and higher education quality is a multidimensional and dynamic concept, which emphasizes compliance with generally accepted standards and expectations of society as a whole, and the striving for continuous improvement of all processes and their outcomes (Bill on Quality Assurance in Science and Higher Education, 2009). The following stakeholders should have an interest in implementing, maintaining and developing quality assurance systems: the state (that is, the relevant ministry), universities and university constituents, students, employers and professional associations (Mencer, 2005). In higher education, "quality assurance" is a comprehensive term which usually includes policies, processes, activities and mechanisms which are employed to recognize, maintain and improve the quality of higher education (Ivković, 2009). Ivković (2009) lists some indicators of quality in higher education; here they are applied to students with disabilities: the demand of students with disabilities for a particular program, the available resources for students with disabilities, the number of students with disabilities enrolled in a program, the success of students with disabilities in exams, dropout rates of students with disabilities, the future of students with disabilities following their graduation (Ivković, 2009). Students are stakeholders in the education process, and a systematic study and appreciation of their attitudes is a necessary precondition for achieving a certain level of quality (Sinković, Sinković, 2008). In ideal circumstances, students are asked about their opinion on the quality of education and included in the development of methods aimed at quality assurance (Ivković, 2009).

The results of the research conducted by Franulović (2009) show that students are satisfied with the education system, their rights in higher education, and their teachers at the university, but they are not satisfied with accommodations in the teaching methods, equipment or teaching aids.

4. Physical barriers: accommodations and solutions

Darija is 23 years old; she is a third-year student at the Faculty of Humanities and Social Sciences in Zagreb. Darija has cerebral palsy and uses a wheelchair. She attended a regular secondary school and had a great wish to go to the university. It took her a long time to decide to pursue her studies in Zagreb. People around her were skeptical at first, but after witnessing Darija's wish and desire to study, they started to support her. Before enrolling in the university, Darija contacted the Office for Students with Disabilities and made enquiries about the rights and opportunities for students with disabilities. Darija is now staying at the student dormitory "Cvjetno Naselje" and has an accessible room. She has made many friends in the dormitory, and after many years she can say she has her own group of friends. Her transportation to the university is provided by the organization "Zamisli" (Imagine). Her colleagues are a great help and support. The teachers are very understanding, and they accept her as an equal member of the academic community. With the help of the Office for Students with Disabilities, the organization "Zamisli", the support of the teachers and colleagues, Darija has been able to overcome all the obstacles in her way.

4.1. Physical barriers

(Elizabeta Haničar and Damir Španić)

Of all the barriers that students with disabilities face in higher education, the most obvious ones are the physical barriers which usually restrict access to parts of a university campus, but also to other facilities of great importance for the quality of student life. The built environment, especially older infrastructure, often seems to have been built to exclude students with disabilities, rather than include them in the academic community (Wolanin and Steele, 2004). Although new buildings are mostly accessible to students with disabilities thanks to the improving legislation, awareness should be raised with respect to barriers in transportation, IT and other equipment, and also to different types of barriers in general.

In addition to the specific barriers that will be discussed in more detail in the sections below, it is important to mention some general barriers that are faced by students with disabilities, and to the ways in which they can be avoided in line with the recommendations for quality construction. In order to create facilities for everyone and to enable the fulfillment of everyone's needs, it is necessary to identify the barriers, which can be vertical, horizontal, ergonomic, anthropometric or sensory (http://www.gradimo.hr/3640.aspx).

Vertical barriers represent the biggest problem for students with motor impairments. Height differences should not be greater than 2 cm for wheelchair users to be able to overcome them. Alternatively, elements of accessibility for overcoming height differences should be introduced (http://www.gradimo.hr/3640.aspx).

Figure 3 - The illustration shows different persons - a wheelchair user, a person with a cane, a person pushing a baby pram - overcoming height differences by means of a ramp (http://www.gradimo.hr/3640.aspx).

Horizontal barriers prevent entry and safe movement in buildings and facilities. Entrances to buildings or interior halls or corridors that are too narrow prevent unobstructed passage of two persons using a wheelchair of other types of mobility aids. On the other hand, doors and passages that are 90 cm wide allow safe passage to everyone. For this reason, all doors and entrances to elevators should be at least 90 cm wide. Access paths to buildings and hallways in buildings should be at least 150 cm wide, allowing one to proceed without having to alter one's navigation path when another person is coming from the opposite direction. Better still, indoor hallways should be 180 cm wide, allowing two persons using wheelchairs or other mobility aids to pass each other by without obstacles. Interior

spaces should be 120 cm wide, with the exception of entrance areas, which should be at least 150 cm wide as they require additional space for other functions and activities (http://www.gradimo.hr/3573.aspx).

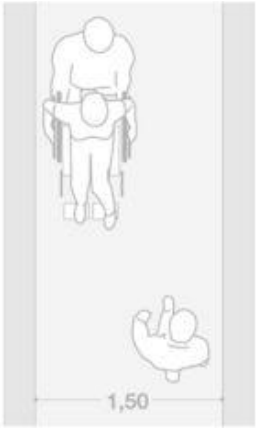

Figure 4 - The illustration shows the width of access paths or hallways allowing simultaneous movement of several persons
(http://www.gradimo.hr/3733.aspx).

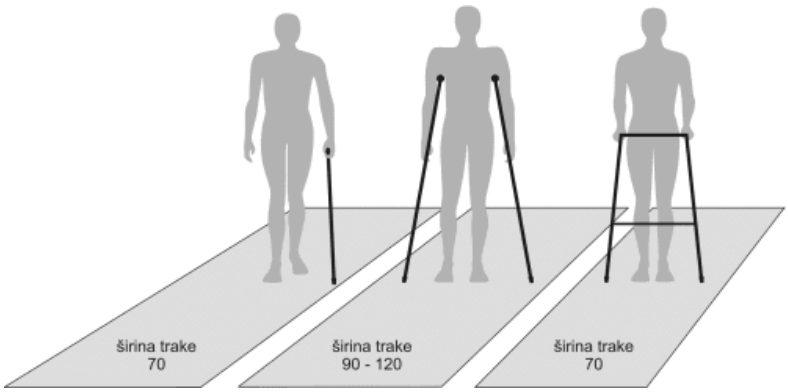

Figure 5 - The illustration shows how much space is required for the use of a cane, crutches and a walker (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Ergonomic barriers prevent or hinder the use of equipment and objects in everyday life (http://www.gradimo.hr/3640.aspx). Ergonomics takes into consideration human beings, their abilities and skills, as well as the limits within which demands may be made on them. This approach enables adequate use of human energy in an environment in which people can produce maximum effect without unnecessary exposure to risks of injury or illness. Ergonomic design is the design of objects for human use in such a way that human

capabilities and limitations are taken into account (http://www.medicina.hr/clanci/ergonomija.htm).

Figure 6 - The illustration shows an ergonomically shaped computer mouse (http://infotrend.hr/clanak/2008/5/ergonomija-i-obveze,12,298.html).

Anthropometric barriers occur when human beings are not the measure of the overall construction planning (http://www.gradimo.hr/3640.aspx). A person having direct contact with a piece of furniture becomes part of the anthropotechnical system made up of an animate part (human body) and an inanimate part (technical facility) (Smardzewski, 2009). Whenever planning or design of any kind is done, the starting point should always be the anthropometric data about people. It is recommended that all equipment should be designed and installed in such a way that it can be used by as many people as possible (http://www.gradimo.hr/3640.aspx).

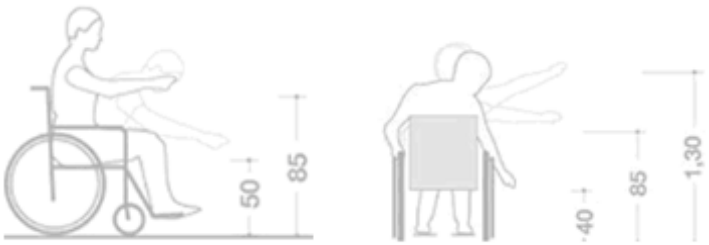

Figure 7 - The illustration shows the vertical area of reach of students in wheelchairs (http://www.gradimo.hr/3573.aspx).

Figure 8 - The illustration shows the horizontal area of active reach of students in wheelchairs (http://www.gradimo.hr/3573.aspx).

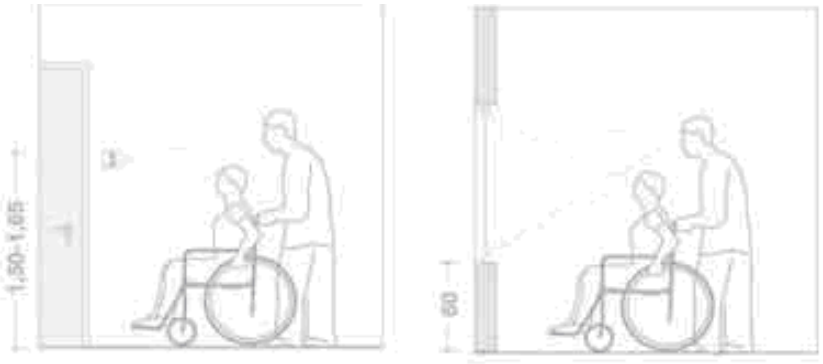

Figure 9 - The illustration shows the visual reach of students in wheelchairs (http://www.gradimo.hr/3573.aspx).

Sensory barriers occur when the requirements and needs of sight impaired and hearing impaired persons are not taken into account during the planning and construction of buildings. Blind and visually impaired persons orientate themselves by touch and/or sound, and deaf persons by sight. Therefore, all information should be available through at least two senses: sight, hearing or touch. It is necessary to ensure the availability, timeliness, comprehensibility and clarity of information. The information should be easy to read, and it should be displayed in letters of appropriate size and font type, with clear contrast. Lighting should be suitably regulated, without a glare, and emergency signage should be displayed in a timely manner (http://www.gradimo.hr/3640.aspx).

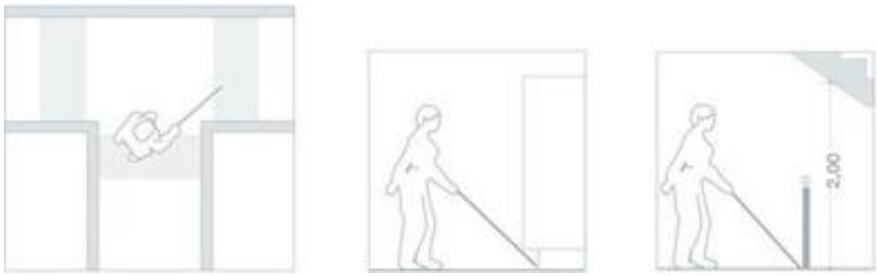

Figure 10 - The illustration shows the movement of sight impaired students indoors. The signs that warn of danger spots can be made by using tactile indicators or they can be visually presented (http://www.gradimo.hr/3640.aspx).

Having presented the types of barriers that students with disabilities face every day, the question arises as to what can be done, and in what way, to remove these barriers not only on paper, but also from the actual environment. Before going into details of the specific barriers related to the facilities where students spend most of their time (student cafeterias, dormitories, classrooms, etc.), we will present a brief overview of recommendations aimed at avoiding those barriers that are common to all facilities. The recommendations are divided into four categories, and they all require the following of a single, simple rule: people with their individual characteristics are the measure of all things. Human body proportions and the need to move determine the design of a space, its dimensions and size, as well as its furnishings and equipment. Where the construction of a building for the largest possible number of people is required, the principles of universal design are applied (www.gradimo.hr/3573.aspx).

4.2. Physical accommodations and solutions

(Elizabeta Haničar and Damir Španić)

4.2.1. Entrance area

Entrance area is defined as an entrance that can be reached either directly from a public pedestrian space or by using elements of accessibility for overcoming height differences (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05). An accessible entrance area should be clearly marked with the international symbol of accessibility.

The design and construction of an entrance area requires special attention; entrances should be designed and constructed in such a way that they can be reached at any time without obstacles. Entrance areas should provide protection from bad weather and precipitation, they should be well lit and enable unhindered movement and usage for everyone (http://www.gradimo.hr/Prilazi-i-prolazi-u-zgradama/hr-HR/3733.aspx).

The entrance area should be wide enough for unhindered movement of students with motor impairments and of visually impaired students who use guide dogs.

Entrance doors should be swing doors or sliding doors. It is recommended that revolving doors should be avoided because they hinder the movement of students in wheelchairs and represent an increased risk for blind and visually impaired students.

Signs should be placed on entrance doors indicating the door opening direction.

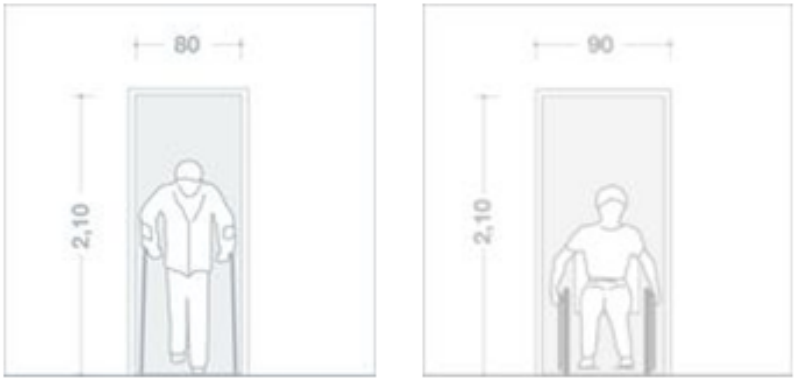

Figure 11 - The illustration shows door width required by a student using mobility aids (left) and a student using a wheelchair (right) (http://www.gradimo.hr/3640.aspx).

4.2.2. Maneuvering space

All persons need space for unhindered movement: their maneuvering space. Adults need 60 cm of space to walk freely, and 60 × 60 cm to turn around the axis of their body. Blind and visually impaired students who use mobility aids need 120 × 120 cm, and students in wheelchairs 150 × 150 cm. A larger maneuvering space requires more space to be envisaged during the design and construction stages. Construction should be carefully

planned to provide enough space for free and unhindered movement for everyone (http://www.gradimo.hr/3573.aspx).

Figure 12 - The illustration shows different dimensions of maneuvering space, which depend on one's requirements (http://www.gradimo.hr/3573.aspx).

4.2.3. Accessible approach

Approach routes and passages include all access paths leading to buildings, entrances to apartments, staircases, elevators and hallways (http://www.gradimo.hr/Prilazi-i-prolazi-u-zgradama/hr-HR/3733.aspx). Adequate design of access paths, passages, entrances and hallways enables unhindered movement and use of these facilities (http://www.gradimo.hr/Prilazi-i-prolazi-u-zgradama/hr-HR/3733.aspx). Access paths should be wide enough for unhindered access. The surfaces should enable unhindered movement of students with motor impairments, and of sight impaired students who use a guide dog or a sighted guide.

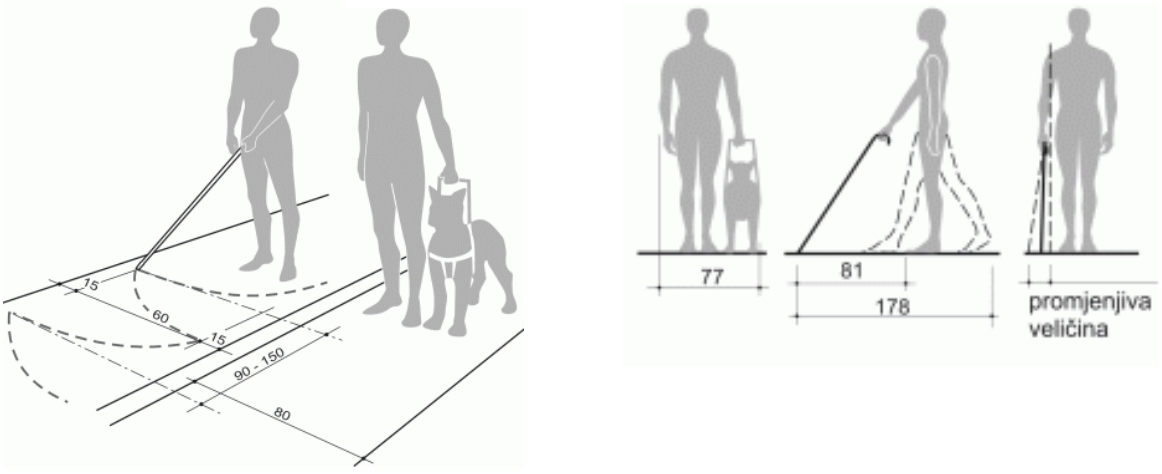

Figure 13 - The illustration shows the space needed for the use of a white cane and a guide dog: the space

needed for the use of a white cane and a guide dog (left) and the dimensions of space required by a blind student with a white cane and a guide dog (right) (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

4.2.4. Furnishings and fittings

Accessible furnishings greatly affect the accessibility of a facility for students with disabilities. When arranging the furnishings, it is necessary to take into account the dimensions required for maneuvering space. The equipment which is accessible from a wheelchair and does not hinder movement should be wall-mounted and stand in contrast to the floor and walls (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05). While selecting the furnishings, the active reach of students in wheelchairs should be taken into account.

Desk and table tops should be at least 85 cm high, with knee space that is at least 70 cm high and at least 50 cm deep. Chairs should have seats that are up to 45 cm high, measuring 40× 40 cm in surface, and a back rest that is 50 cm high (Neufert, 2002).

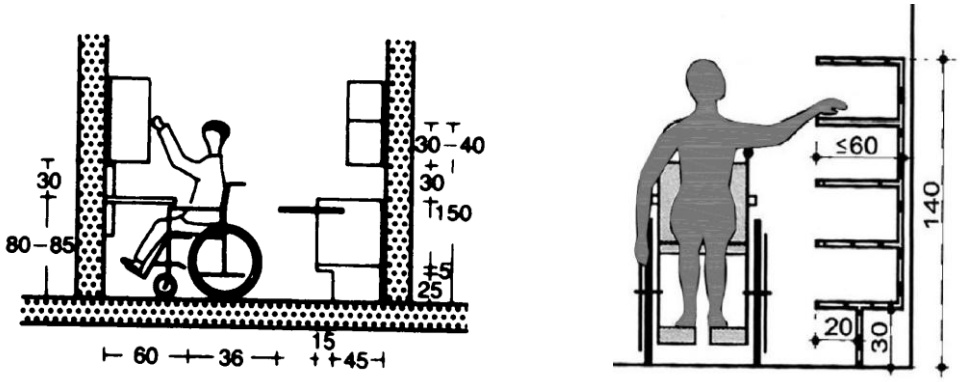

Figure 14 - The illustrations show furnishings that are accessible to students with disabilities. The illustration on the left shows a workstation and wall-mounted units within the active reach of wheelchair users (Neufert and Neufert, 2000). The illustration on the right shows a shelf within the active reach of a wheelchair user. (http://www.webgradnja.hr/lifestyle/adaptacije-interijera-ured-arhitekta-kriznjak/stan-za-osobu-s-invaliditetom/427/).

4.2.5. Tactile strip, tactile warning strip, visual alarm

Sight impaired students orientate themselves by touch and/or sound, while hearing impaired students use their sight for orientation. For this reason, it is necessary to provide accessible, timely and clear information through at least two senses.

Tactile strips and tactile warning strips are used by sight impaired students for orientation. It is recommended that tactile strips leading from the entrance area to public areas should be provided in order to facilitate orientation for blind and visually impaired students.

Visual alarms and communication aids should be provided for hearing impaired students.

4.3. Student housing

(Nataša Pavlović)

During the course of their studies, students with disabilities can stay in student dormitories or in private housing. Students opting for private housing make arrangements for their housing individually. Students with disabilities with "a physical impairment rating of over 50%" (Decision on the Criteria for Allocation of Rooms in Student Dormitories in the Republic of Croatia, Academic Year 2010/2011), including students enrolled in postgraduate study programs, exercise a direct right to housing in student dormitories. Their status is awarded on the basis of a decision on the physical impairment rating made by the Croatian Pension Insurance Institute (HZMO).

A student dormitory accessible to students with disabilities should meet certain criteria. In addition to an accessible entrance area and an accessible route of travel, it should include a suitable number of accessible rooms, toilets, bathrooms with bathtubs or shower stalls, and an accessible bulletin board. The number of accessible rooms in a student dormitory is determined in such a way that there should be one accessible room for 1-50 regular rooms, and an additional accessible room for each successive 10 rooms (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG 151/05).

An accessible student room should meet the usual conditions of accessibility: the room should contain sufficient maneuvering space, as well as enough space for movement

around the furniture. The doorway should have a clear opening of sufficient width for the passage of a student in a wheelchair. The room should have doors and windows with accessible handles, and accessible electrical outlets and light switches (see Chapter 9).

Figure 15 - The photograph shows the entrance to an accessible student room. The door is wide enough, and the hall has enough maneuvering space. However, the hanger is not within the reach range of a student in a wheelchair.

Door and window handles should be accessible, appropriately designed and easy to use (see Chapter 9).

Figure 16 - Examples of bad practice (left) and good practice (right): The photograph on the left shows an inaccessible, round door knob, while the photograph on the right shows an accessible, lever-style curved door handle that is easy to use without applying too much force, in high contrast to the background.

Electrical outlets and light switches should be accessible (see Chapter 9) and have a light indicator. All fittings for electrical outlets and light switches should be in high contrast to the background.

In addition to this, the student room should have a wall-mounted desk (attached to the wall on one side) of appropriate height and clearance from the floor to the underside, as well as appropriate depth to allow wheelchair access. The chair and bed should be ergonomically shaped. The shelves and closets should be situated within the reach range of a wheelchair user (see Chapter 9).

Each accessible room in a student dormitory should be marked with the international symbol of accessibility.

Figure 17 - The photographs show an accessible student room. The desk enables wheelchair access (left). The room has enough maneuvering space, and the bed with drawers is accommodated for students with mobility impairments (right).

An accessible toilet in a student dormitory should have a doorway of sufficient clear opening width for the passage of a student in a wheelchair. An outward-swinging or sliding door should be used. The toilet door should have an accessible door handle and, if possible, a mechanism allowing them to be opened from the outside if the student should call for assistance. The toilet bowl should be of appropriate height, and the distance from the front part of the rim to the wall should be sufficient to allow maneuvering space. Two grab bars

should be attached to the wall next to the toilet bowl. At least one of the grab bars – the one on the accessible side of the toilet bowl – should be a folding type, while the other can be fastened to the wall. The flush button should be set at a height accessible to wheelchair users, or the flush mechanism should include a sensor (see Chapter 9).

The toilet should contain a wall-mounted washbasin whose height and width should be accommodated for students with disabilities. The siphon should be located inside the wall or directly next to it, to ensure sufficient knee space. The washbasin should include a single lever mixer tap or a sensor mechanism allowing the student to turn the water on and off. The mirror should be slanted and set at a height appropriate for students in wheelchairs.

There should be a clear space in front of the washbasin and toilet bowl to ensure enough maneuvering space in the room.

The toilet should have an alarm with a touch button or a pulling string. All other equipment, such as the clothes hanger, should be located within the reach range of a wheelchair user, while not impeding mobility.

Figure 18 - The photograph shows an accessible toilet with grab bars and sufficient maneuvering space.

Figure 19 - The photograph shows an accessible washbasin with an ergonomically shaped single lever mixer tap.

An accessible bathroom in a student dormitory should have a doorway of sufficient clear opening width for the passage of a student in a wheelchair, doors and windows with accessible handles, as well as accessible electrical outlets and light switches, as described earlier in the text.

If the bathroom contains a bathtub, it should be equipped with a bath lift and grab bars. The rim height should be accommodated to the height of a wheelchair seat.

An accessible shower area, which is the more frequent option in student dorms, should have specific floor plan dimensions and no shower partition, and should include a grab bar. The showering area should include a waterproof folding seat matching the height of the wheelchair (see Chapter 9).

If the bathroom and the toilet make two separate rooms, the bathroom should include all the equipment for an accessible toilet (washbasin, tap, mirror, alarm, clothes hanger) in line with the regulations. All the equipment should be wall-mounted and within reach range of a wheelchair user, while not impeding mobility.

Each accessible bathroom should be marked with the international symbol of accessibility.

Figure 20 - The photograph shows an accessible shower area with a waterproof folding seat, a grab bar and an alarm (http://jordanbuildersandjoiners.co.uk/disabled-access/).

In addition to the usual conditions regarding door width, accessible handles, electrical outlets and light switches, as well as necessary maneuvering space, an accessible kitchen in a student dormitory should meet some specific criteria. The worktop should be of a specific length. The cooktop and the sink should be wall-mounted and should have a knee space depth suitable for wheelchair users. The top surface should be within the reach range of a wheelchair user, and it should be of appropriate height and clearance from the floor to the underside. When mounting the suspended elements, it is necessary to bear in mind the reach range of a person in a wheelchair. The bottom elements should be designed in such a way that allows them to be pulled out (see Chapter 9). An accessible kitchen should be marked with the international symbol of accessibility.

Figure 22 - The photograph shows an accessible kitchen for students with disabilities in the student dormitory “Stjepan Radić”.

An accessible bulletin board in a student dormitory should be set at a height corresponding to the visual field of a wheelchair user (see Chapter 9).

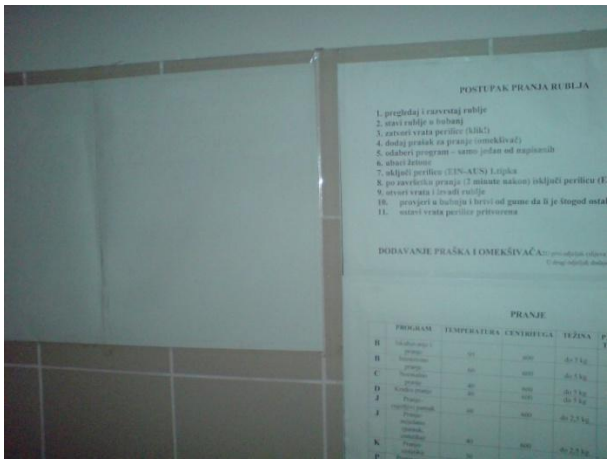

Figure 23 - The photograph shows instructions for using the washing machine and dryer in the student dormitory “Ante Starčević” in Braille (left) and in regular print (right).

The “Cvjetno Naselje” student dormitory in Zagreb was the first dormitory with rooms accommodated for students with disabilities, and it still hosts the largest portion of students with disabilities in Zagreb today. Nineteen rooms accommodated for students in wheelchairs were built in this dormitory in 1998 (Marijon 2005; Kiš-Glavaš, Ruškan and Rudić 2005). The “Stjepan Radić” student dormitory has twelve accessible rooms, while the “Ante Starčević” student dormitory has nine. A total of 116 students with disabilities are housed in student dormitories in Zagreb at the moment of writing this handbook.

New, accessible student dormitories have also been built or are under construction in other Croatian cities: Osijek, Varaždin, Split and Rijeka. For instance, the new student dormitory in Osijek has seven accessible rooms (of the total of 250). The student dormitory in Varaždin has four accessible rooms, which can house up to nine students. The student dormitory “Hostel” in Split has three rooms accommodated for students with disabilities, while the new student dormitory, currently under construction, should have six accessible

rooms. The student dormitory of the University of Zadar has two twin rooms accommodated for students with disabilities, and the construction plan for the new student dormitory in the university campus includes an increase in the number of rooms accessible to students with disabilities. The student housing project “Ivan Goran Kovačić” in Rijeka has no rooms or other areas accommodated for students with disabilities, but accessible accommodation has been included in plans for new facilities within the university campus currently under construction.

Based on a study done on a sample of 51 students with disabilities at the University of Zagreb living in student dormitories “Cvjetno naselje”, “Ante Starčević” and “Ivan Meštrović”, Franulović (2009) reports that the average level of satisfaction with accessible rooms in the student dormitories rates at 4.53 (on a scale from 1 to 5), which indicates that the rooms are mostly accommodated to the needs of students with disabilities in a satisfactory manner.

Despite these encouraging findings, when it comes to the housing of students with disabilities in Croatian university cities, there is a lot of room for improvement. First of all, accessible housing should be provided in those university cities which have no such housing at this time. In those cities where student dormitories are partially accommodated, the number of accessible rooms should be increased in accordance with the Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility (OG 151/05).

In addition, the following measures should also be implemented as soon as possible (Kiš-Glavaš, Ruškan and Rudić 2005):

- To adjust the quality of housing in line with the type of impairment and the needs it entails;
- To ensure support services which would include medical assistance for students with reduced mobility (getting up from bed, morning hygiene); physiotherapy etc. in coordination with student centers;
- To provide personal assistants at all student dormitories (following the example of “Cvjetno naselje”), who would be at the disposal of students with reduced mobility 24 hours a day to facilitate the activities of daily living (shopping, hygiene and grooming, housework, etc.).

Without adequate housing, it is clearly impossible to ensure the preconditions of quality access to higher education for students with disabilities. Therefore, issues related to housing for students with disabilities should by no means be neglected when it comes to physical accessibility in higher education.

4.4. Student restaurants and cafeterias

(Asja Barić)

In addition to housing, meals form an important part of student life. In Croatia, costs of student meals are partly covered by the state through subsidies. Depending on the subsidy awarded by the Ordinance on Reimbursement of Student Meal Costs (OG 51/02), the students receive a certain amount of money intended to cover the costs of their meals. However, students with disabilities do not fall into the category of students whose meal costs are covered. The University of Dubrovnik is the only institution in Croatia which has called on the state bodies to subsidize meals for students with disabilities. The Student Centre in Dubrovnik has announced a competition for meal subsidies, whereby the right to cost coverage is granted to students with disabilities of categories 1 to 5 (i.e. with a physical impairment rating of over 50%) (Criteria for Reimbursement of Student Meal Costs, Academic Year 2010/2011).

Student cafeterias are among the most frequently used facilities during the course of one's studies. In Croatia, accommodations have not yet been made in student cafeterias in a systematic way. The student cafeteria at the Faculty of Philosophy in Split can be used as an example of bad practice. The cafeteria is located on the ground floor, but access is obstructed by three stairs with no access ramp for students in wheelchairs. The student cafeteria serving the Faculties of Architecture, Civil Engineering and Geodesy is located in the basement, and can only be reached by a staircase. In Rijeka, the situation varies when it comes to physical accessibility. In the student cafeteria “Indeks”, only the ground floor has been accommodated for wheelchair access, while the level on which a pizzeria, café and toilets are located is still inaccessible, as it can only be reached by a staircase. The cafeteria “Medicinar” is inaccessible because access to students in wheelchairs is not possible. Student cafeterias in Dubrovnik are located in several restaurants and hotels with accessible approach for students with disabilities, and elevators. The student cafeteria in Osijek is a

recent building and has been constructed in accordance with the Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility (OG 151/05). The deficiencies of student cafeterias mentioned above require physical accommodations such as an accessible approach, entrance area, enough maneuvering space and other elements of accessibility.

For student cafeterias to meet the conditions of physical accessibility, it is recommended that they should be situated on the ground floor. Failing that, elements for overcoming height differences should be used.

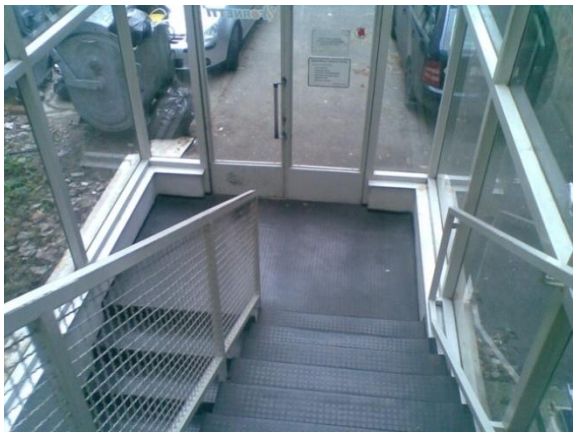

Figure 24 - An example of bad practice: The photograph shows a staircase leading down to the basement where the student cafeteria is located.

The entrance to a student cafeteria should be wide enough to allow barrier-free passage of students with motor impairments, as well as blind or partially sighted students with seeing guides or guide dogs. Barrier-free passage is attained by using a single door with a clear opening width larger than the width of a wheelchair, or by using a double door. The entrance door should have an accessible door handle placed within the reach range of a student in a wheelchair and in high contrast with the door background (see Chapter 9). The door should be either a swing door or a slide door, while revolving doors are not recommended because they present difficulties for blind/partially sighted students and students with motor impairments. If doors and partition walls are made of large glass panes with no grills, they should be clearly marked (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG 151/05). An example of good practice is

a door that can be opened by means of a mechanism or an infrared light sensor (http://www.gradimo.hr/3640.aspx).

It is desirable to provide an additional entrance for students with disabilities in case of long lines in front of the main entrance, which are a common occurrence.

Figure 25 - The photograph shows an accessible double entrance door.

Maneuvering space in student cafeterias is imperative, and should be appropriately sized to allow unobstructed navigation. It should be unobstructed by tables, chairs and other vertical barriers.

Figure 26 - An example of bad practice: The photograph shows a student cafeteria in which a partition wall hinders access and maneuvering.

The approach route should be wide enough to allow barrier-free mobility of students in wheelchairs (see Chapter 9). It should allow barrier-free mobility of blind/partially sighted students using the assistance of seeing guides or guide dogs. Students with disabilities should be given priority in queues in student cafeterias and other facilities in general.

It is important to ensure maximum legibility of key information (http://uik.hr/dizajn-invalidi/nacela_univerzalnog_dizajna/). The menu commonly displayed near the counter should contain information written in regular print with a font large enough for partially sighted students, and if possible also printed in Braille for blind students. It would be desirable to introduce a list of ingredients that may cause allergic reactions. Printed menus should be provided which the students can use to indicate the meal and drink they wish to purchase by handing it in at the counter (for more information see the handbook entitled General Guidelines, Chapter 3).

It is necessary to ensure an area with tables whose table top is within the reach range of a student in a wheelchair, and whose clearance from the floor to the underside and knee space have the dimensions that are suitable for wheelchair users (see Chapter 9). The area should be equipped with adequate chairs, and suitable for students with motor impairments, blind/partially sighted students, seeing guides and guide dogs. To allow ordering of food and drink and payment, a special wall-mounted counter should be fitted in the immediate vicinity of the eating area in such a manner that its top surface is within the reach range of a student in a wheelchair (see Chapter 9). If possible, an assistant should be provided to get the food, dispose of the food tray, etc. and to spare the student with disabilities from having to queue. Students with disabilities should be provided a place as close to the entrance as possible to enable free flow of movement, while taking care not to isolate (discriminate) them from socializing with other students.

The student cafeteria at the “Cvjetno naselje” student dormitory can be singled out as an example of good practice. Several tables are set aside for students with disabilities, and the staff assist with the ordering and paying. Student cafeterias at the University of Rijeka also offer the possibility of staff assistance with student meals.

Tactile strips should be fitted to direct blind/partially sighted students to the counter and eating area, as well as tactile warning strips informing them about spatial barriers. The

floor surface should be made of firm material which does not impede the movement of a wheelchair (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG 151/05).

It is recommended that a visual display should be introduced to help the hearing impaired students, but also students in general. The students would take a number and wait until it flashes on the display (as in banks). The cafeteria at the Student Center in Zagreb is an example of bad practice, where the numbers are called out, reducing access for hearing impaired students.

Sound signals are not recommended because of the noise levels in cafeterias. Blind/partially sighted students should be provided with a seating area, and should have their ordered food/drink delivered to their tables instead of queuing up, as sound signals are inefficient in this situation.

If speech is transmitted through loudspeakers, it is desirable to install an audio frequency induction loop (AFIL) for hearing impaired students.

The counter for orders and payment, as well as the eating area, should be well lighted for partially sighted persons.

It is desirable for the cafeteria to have a toilet that is accessible to students with disabilities, in accordance with the Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility (OG 151/05). It is recommended that accessible spaces should be marked with the international symbol of accessibility.

4.5. Transportation

(Nataša Pavlović)

Transportation is the basic prerequisite for achieving equal opportunities. Students with disabilities should therefore be able to have at their disposal accessible transportation from their place of residence to the site of their primary academic activities (classes, seminars, practical work, fieldwork and lab work), but also to the site of any other activities related to student life (social, cultural, sports events, etc.).

The ultimate goal should be for the entire transportation system to become accessible to all persons with disabilities. For this purpose, the Government of the Republic of Croatia (2007) in its National Strategy to Create Equal Opportunities for Persons with Disabilities envisages the following activities (OG 63/07):

1. To ensure bus/tram stops, train platforms, parking spaces, public pedestrian areas, traffic signals, pedestrian crossings and refuge islands, and crossroads accommodated for persons with disabilities where this has not been done yet, in accordance with the Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility (OG 151/05);

2. To ensure access to public transport for persons with disabilities on all intercity lines where this has not been done yet, to introduce accessible buses and railway cars, to equip railway stations with wheelchair lifts; in city transportation, to ensure accessible vehicles for persons with disabilities; to ensure access to ships and aircraft; to ensure accessible taxi transportation for persons with disabilities;

3. To inform the passengers about intercity trains and railway stations which are accessible for wheelchair users.

The document also points out that the following improvements have already been made in many areas:

- When building a new road, attention is paid to curb cuts;
- Audible traffic signals are used at crossroads;
- Tactile strips for blind persons are installed, and audible and visual notifications in public transportation vehicles are used;
- Transportation of blind persons who use the assistance of a guide dog is allowed in all vehicles of public transportation;
- Accessible vans, low-floor trams and buses have been introduced.

However, the National Strategy to Create Equal Opportunities for Persons with Disabilities from 2007 to 2015 (OG 63/07) also stresses the need for additional efforts with regard to accessibility: the availability of accessible transportation on all lines, including

intercity ones, the accessibility of timetables and vehicles, and clear and accessible information at terminals and in vehicles.

The accessibility of the entire transportation system will allow students with disabilities full or at least greater independence and flexibility of mobility, adding to their equal participation in all aspects of student life. Until that moment, students are mostly using accessible vans run by associations or city services. In those areas or situations where public transportation is not accessible to persons with disabilities and specially accommodated transportation either does not exist or is difficult to use, it is recommended that alternative forms of education (such as e-learning) should be considered in agreement with the student.

Figure 27 - The photograph shows a van for the transportation of students with disabilities. A folding vertical wheelchair lift can be seen, and – inside the vehicle – a safety belt for fastening a wheelchair.

Some students with disabilities have the right to reimbursement of a part of their transportation costs, which they can exercise by submitting a document confirming their physical impairment rating. This right can be exercised by students with disabilities attending academic or professional studies, or postgraduate study programs, with a minimal physical impairment rating of 60% who are Croatian citizens and unable to independently use public transportation (Decision on the Criteria for Reimbursement of Transportation Costs for Full-Time Students with Disabilities of Academic and Professional Study Programs and Post-

Graduate Study Programs, Academic Year 2010/2011). It would be advisable to amend the criteria to account for the kind of impairment in addition to the impairment rating, since not all types of impairment are equally relevant when it comes to transportation.

In the capital of Croatia, the Zagreb public transport company ZET has had a Department for the Transportation of Persons with Disabilities since 1994, which provides daily use of accessible vans to transport persons with disabilities to school, university, work and other places. The right to this kind of transportation is granted following a request submitted to the Department for the Protection of Persons with Disabilities of the City Office for Health, Labor, Social Protection and Veterans (http://www.zet.hr/osobe-s-invalidnoscu.aspx). Students, school children and the employed have priority over other persons with disabilities when they are using the vans to get to school, university or workplace. Although the efforts made by ZET are commendable, the key problem is the relatively small number of accessible vans (only 10 at the time of writing this Handbook) relative to the number of users. In the morning, school children and the employed have priority over university students, and as a result university students can have difficulty getting to classes which start at 8 a.m. In some Croatian cities the situation is even worse because university students do not enjoy a privileged status when it comes to accessible transportation at all, which should certainly be changed.

Associations (for instance, *Zamisli*, *Korak*) also provide transportation services for students from student dormitories to their respective faculties. However, they receive far more requests than the number of vans they have at their disposal. In addition, the funds for drivers and fuel depend on the projects the associations have been awarded, which means that the permanent availability of funds (and therefore of services) is uncertain.

On the topic of transportation, accessible parking spaces for students with disabilities must be also mentioned. It is recommended that the accessible parking spaces should be located closest to the accessible entrance to the facility (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG 151/05).

An accessible parking space for a single vehicle should be of specific dimensions, while an accessible parking space for two vehicles requires an aisle. Access routes leading from the parking space to the pavement should have a curb cut or curb ramp (see Chapter

9). The surface of the parking space should be made of a material which does not obstruct movement in a wheelchair (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG 151/05).

Accessible parking spaces should be marked with the international symbol of accessibility (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG 151/05).

Table 1 - The table shows the recommended number of accessible parking spaces relative to the total number of parking spaces (Adaptive Environments Center, Inc. and Barrier Free Environments, Inc. 1995).

Total number of parking spaces	**Accessible parking spaces**
1 to 25	1 accessible space
26 to 50	2 accessible spaces
51 to 75	3 accessible spaces
76 to 100	4 accessible spaces

In situations where accessible parking spaces do not exist, the appropriate number of accessible parking spaces can be ensured by means of simple procedures such as repainting the stripes.

4.6. Classrooms

(Asja Barić)

During the course of their studies, students spend most of their time in classrooms or lecture halls. A prerequisite for high quality classes is the students' concentration and the physical accessibility of the classroom. At Croatian universities there are still classrooms which are inaccessible. An example of bad practice can be found in the building housing the Faculties of Architecture, Civil Engineering and Geodesy, where some lecture halls have fixed seating on a sloped floor, and the seats can only be reached by stairs. One of the buildings

housing the Faculty of Philosophy in Split has no elevator, which makes access to classrooms located on upper floors impossible. Conversely, the hallways of the building housing the University of Dubrovnik have handrails leading to the classrooms. The University Centre of Professional Studies in Split will make the necessary accommodations to its premises next year (2011/2012) and meet all the conditions of physical accessibility for students with disabilities.

Spatial accommodation of classrooms is important for unobstructed movement of students with disabilities. Particular attention should be paid to ensure an accessible approach, entrance area, sufficient maneuvering space and other elements of accessibility.

In order for classrooms to be accessible to students with disabilities, it is recommended that they should be located on the ground floor. Failing that, an elevator, ramp, escalator or a vertical wheelchair lift should be installed.

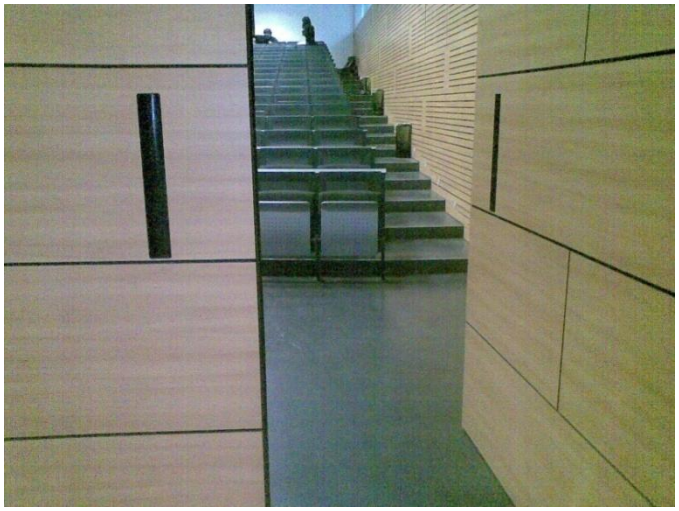

Figure 28 - An example of bad practice: The photograph shows a lecture hall designed in such a way that the students can only reach the seats by stairs; and the swing door is difficult to open, as the entire panel needs to be hand-pushed.

The entrance area in should be wide enough to allow unobstructed passage of students with motor impairments and blind/partially sighted students with a seeing guide or guide dog. Level differences in the entrance area should be avoided.

The entrance door should have a clear opening width that is larger than the width of a wheelchair, and it should be a swing door or slide door, which is easy to open (see Chapter 9). The door should be clearly marked. An accessible classroom should be marked with the international symbol of accessibility (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG 151/05).

The maneuvering space should be of appropriate dimensions to allow unobstructed movement, and it should be free of barriers such as tables, chairs and other vertical barriers. The space for movement around the furniture should be larger than the width of a wheelchair, and should allow unobstructed and independent movement (see Chapter 9).

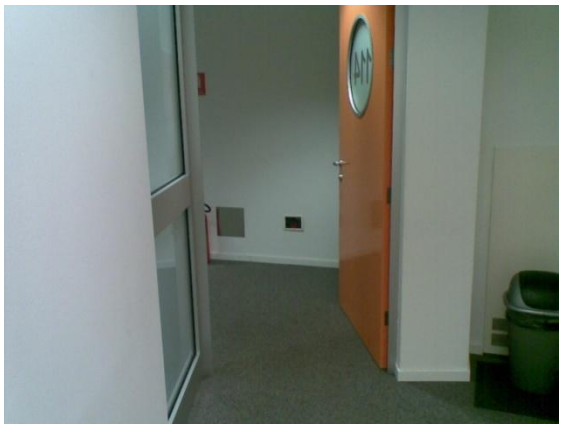

Figure 29 - The photograph shows an entrance door which is easy to open and clearly marked with large numbers.

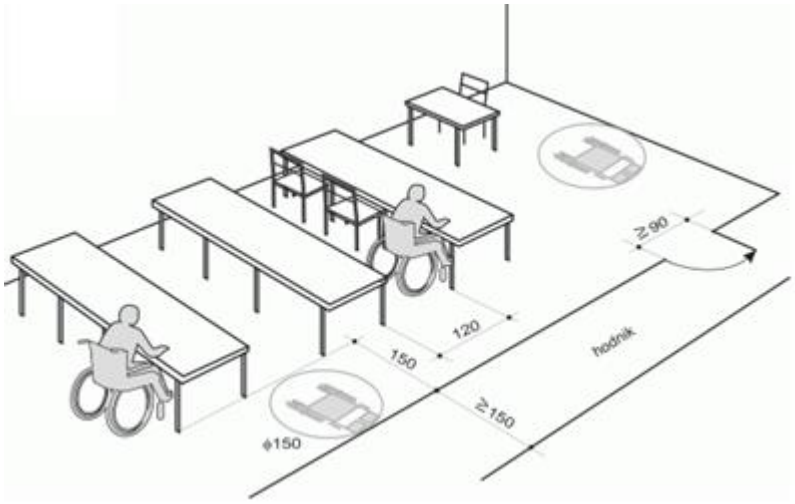

Figure 30 - The illustration shows an accessible classroom with sufficient maneuvering space (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG 151/05).

Figure 31 - The photograph shows a classroom designed in such a way that the entrance is on the same level as the floor, and there is a sufficiently wide aisle between the desks to allow barrier-free passage.

The approach should be wide enough to allow unobstructed access to a seat. If necessary, the services of an assistant should be provided, who will direct the student from the entrance to a seat in the classroom from where participation in class will be possible. The space should allow unobstructed movement of students with disabilities.

The arrangement of furnishings and fittings in classrooms should be accommodated for students with disabilities, as most movement takes place inside the room. Therefore, a suitable arrangement of desks and chairs intended for students in wheelchairs, blind/partially sighted students, seeing guides and guide dogs should be ensured. Desks should be provided whose top surface is within the reach range of a student in a wheelchair, and with a clearance from the floor to the underside and depth providing sufficient knee space, suitable for wheelchair users. The doors and windows should have accessible handles which should be appropriately shaped, placed within the reach range of a student in a wheelchair and easy to use (see Chapter 9). Hearing impaired students have no problems with physical accessibility, but it is advisable to ensure a seat for them and their interpreter/notetaker (if they have one) in the first row, in a place with enough light so they can follow the teacher or interpreter more easily, or take notes during presentations, which are often shown in the dark. Students in wheelchairs should be provided with desks of a

suitable height, as well as suitable lighting during presentations. It is recommended that the seating should be located on the same level as the entrance area to ensure unobstructed movement. If this is not the case, a ramp should be installed. Suitable seating should be provided with a sufficiently wide aisle. The student should be seated as close to the entrance as possible to minimize obstruction of movement, and also to be as close as possible to the teacher to be able to follow the lecture more easily.

Tactile strips and warning strips leading to accessible classrooms should be put in place (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG 151/05) to facilitate the orientation of blind/partially sighted students. It is recommended that blind/partially sighted students should familiarize themselves with the building, either on their own or in the company of their peripatologist.

Sound notification and visual alarms are crucial in case of an emergency evacuation. An evacuation plan in the event of an emergency (fire, explosion, earthquake, terrorist attack, etc.) should be put in place for students with disabilities, and for persons with disabilities in general, as they are unable to react promptly and thus evade danger. Unlike the EU countries, Croatia does not yet have evacuation plans and procedures for persons with disabilities.

The plan should include all possible ways of evacuation. Elevators should not be used during emergency evacuation but fire elevators can be used by persons in wheelchairs. Blind/partially sighted students should rely on seeing guides during the evacuation. There are some simple technological options such as the evacuation chair for wheelchair users and other persons with mobility impairments, colored handrails in staircases for blind/partially sighted persons, and visual or vibration alarms for hearing impaired persons. It is important to take into account the accessibility of the building for the evacuation of persons with disabilities (http://www.mmu.ac.uk/humanresources/health/ manual/pdf/evacuation-disabled-people.pdf).

It is advisable to have an audio frequency induction loop (AFIL) installed in classrooms for hearing impaired students if the teacher uses a microphone during class.

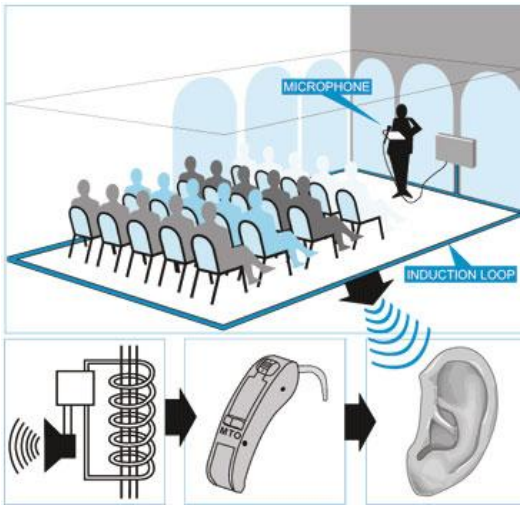

Figure 32 - The illustration shows the use of an AFIL (http://www.assistiveaudio.com/facts.htm). For more information, see General Guidelines, Hearing Impaired Students and Deaf Students (Chapter 4).

4.7. Computer rooms

(Zrinka Udiljak-Bugarinovski)

Contemporary technological achievements are almost indispensable for the learning process and the acquisition of new knowledge, skills and competences. For this reason, much thought is being given to the application of assistive technology in the education process of students with disabilities. In addition to the application of specific hardware and software solutions aimed at facilitating the use of computers, physical accessibility of computer rooms to students with disabilities should also be ensured. The accessibility of computer rooms should be marked with clear and noticeable symbols of accessibility.

Physical access to a computer room requires accommodations in accordance with the Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility (OG 151/05). A computer room is considered accessible if adequate accommodations have been made to the following:

a) The parking lot and the access area leading to the building;
b) The entrance area leading to the computer room;
c) The workstations in the computer room.

When making accommodations to the parking space and the access area leading to the building where the computer room is located, it is advisable to stick to the principles of universal design (http://www.ncsu.edu/www/ ncsu/design/sod5/cud/about_ud/udprinciples.htm).

It is advisable to mark the interior with a tactile strip and warning strip to warn students with disabilities about various parts of the building on their route to the computer room. The entrance to the computer room should involve enough maneuvering space for a wheelchair user, and the door should be wide enough and easy to open. Inside the computer room, sufficient maneuvering space should be ensured. When designing the workstations for students with disabilities, ergonomic and anthropometric barriers should be taken into consideration. When selecting the furniture and equipment, students with disabilities and manufacturers should be consulted, and the principles of universal design adhered to. The furniture and equipment inside the computer room should be arranged in the following manner (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG 151/05; Bogdanović, 2007):

- Mobility should not be hindered;
- The furniture and equipment should be easy to use;
- The depth and height of the furniture should be in accordance with the user's needs (for instance, desks with adjustable height are recommended);
- Chairs should have fixed armrests;
- Desks should have sufficient knee space depth for wheelchair users, and should be of appropriate height and with sufficient clearance from the floor to the underside for the wheelchair armrest to fit;
- Window handles should be appropriately shaped and placed within the reach range of wheelchair users; the handle or opening/closing mechanism should be easy to use);
- An AFIL should be installed if the classroom is used by more than 100 persons and speech is transmitted by loudspeakers.

In some cases, the accessibility of computer technology can be improved by simply repositioning the keyboards and computer screens. Most obstacles can be overcome by applying various hardware and software solutions, also known as assistive technology. Hardware solutions in the application of ICT in the education of students with disabilities can refer to the following:

- Accessible keyboards;
- Accessible computer mice;
- Other accessible hardware solutions.

Figure 33 - The photograph shows the interior of an accessible computer room, with accessible computers for students with disabilities marked with the international symbol of accessibility.

In addition, it would be advisable to create the following (http://www.savez-slijepih.hr/hr/kategorija/pomoc-slijepima-pri-obrazovanju-231):

- An ordinance on computer classrooms for students with disabilities; and
- A short brochure for computer users in Braille and/or using an audio guide.

4.8. Laboratories and rooms for practical classes

(Ivan Dolanc and Elizabeta Haničar)

Faculties which allow the enrolment of students with disabilities in their study programs should ensure equal rights and opportunities for participation in all types of classes without discrimination (Anti-Discrimination Act, OG, 85/08; Convention on the Rights of Persons with Disabilities, 2006), respecting individual abilities and needs of a student (Convention on the Rights of Persons with Disabilities, 2006). This is supported by the Constitution of the Republic of Croatia (OG, 85/10) which states that "everyone shall have access to education under equal conditions". One type of classes, which are held outside of lecture rooms and which effectuate the element of practice in a curriculum, are classes held in laboratories and rooms for practical classes. Excuses are often heard from the university constituents which do a significant part of their exercises in laboratories (biomedical, biotechnical and natural sciences) that they do not have or do not enroll students with disabilities. Each institution of higher education should ensure access for students with disabilities to the premises where exercises are held, and enable their active participation in the exercises, with or without the assistance of mentors, student tutors, assistants or personal assistants.

A laboratory is a room where research, measurements and experiments are conducted under controlled conditions. Depending on the type of experiments which are conducted (chemical, metallurgical, medical, etc.), laboratories can be organized in different ways. Regardless of the type of a laboratory, it is important to provide access to students with disabilities and enable them to use it.

It is recommended that laboratories should have a ground plan for orientational purposes, due to the specific characteristics of such rooms and the activities for which they are designed. Concerning entrance areas (see section 5.2.1.), it should be taken into account that they will also be used by students who need a larger maneuvering space. In the interior area, in addition to maneuvering space, it is important to take into consideration the reach range of persons in wheelchairs (see section 5.1.).

Some laboratories have a separate room for students' personal belongings (a locker room). That room should also be made accessible for students with disabilities. When selecting the lockers for this room, reach range of students in wheelchairs should be taken

into consideration. Sufficient maneuvering space should also be ensured. In case there are seats in the room, an appropriate number of them should be accessible for students with disabilities. The seats should be of the appropriate height for a wheelchair user. If there are clothes hangers above the seats, they should be placed within the reach range of students in wheelchairs (see Chapter 9). An accessible locker room should be marked with the international symbol of accessibility.

The laboratory furnishings, fittings and equipment should be in accordance with the needs and capabilities of students with disabilities. It is necessary to ensure that laboratory equipment and furnishings are located within the reach range of students in wheelchairs. An area should be provided with desks which have the top surface within the reach range of students in wheelchairs, and enough knee space to ensure wheelchair access. Chair dimensions should fulfill the recommended criteria with regard to the height and size of the seat and back (see Chapter 9). It is recommended that the shelves for chemicals and equipment have clear and legible signs in Braille and in standard print. When arranging the furnishings, the dimensions which are needed for maneuvering space should to be taken into consideration. Furnishings and equipment, which should be accessible from a wheelchair and which should not obstruct movement, should be wall-mounted, and in high contrast to the floor and walls (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility (OG 151/05)). Fittings and other equipment should be built-in and/or placed in niches. The space between the desks should allow unobstructed movement of students in wheelchairs (see Chapter 9). If microscopes are used, attaching them to the desktop will make them considerably easier to use by students with motor impairments. An accessible laboratory should be marked with the international symbol of accessibility.

Figure 15 - Examples of bad practice: The photograph shows laboratory equipment which is outside the reach range of students in wheelchairs (left), and desks whose height is more than 85 cm (right).

All assignments, instructions for the exercises and warnings should be written in standard print and in Braille. Attention should be paid to the way in which the labels on chemicals are written: It is important that they should be easily recognizable. It is recommended that labels should use standard print and Braille, with lettering in high contrast to the background, a larger font size, and giving full names and abbreviations. It is also possible to use associative colors. Color contrasts with the same or similar degree of saturation should be avoided. (http://www.gradimo.hr/Prilazi-i-prolazi-u-zgradama/hr-HR/3733.aspx).

Figure 16 - Examples of bad practice: The photograph on the left shows a shelf of chemical containers outside the reach range of students in wheelchairs. The photograph on the right shows chemical containers with hand-written names of chemicals.

The level of light intensity should be determined with regard to the level of illumination of the environment. It is recommended that each workstation should have a fixed lamp which students can adjust without assistance. The area should be equipped with a visual alarm and/or audible signal, which should ensure easy orientation for students with disabilities in emergency situations. It is also necessary to prepare an emergency evacuation plan (see section 5.6.).

If students with disabilities need assistance, they may be provided with a personal assistant. The personal assistant should be trained. Assistance can be offered for reading the assignments, for drawing following the instructions of a student with a disability, or for page turning. Partial assistance for completing a practical exercise following instructions from a student with a disability can also be provided, as well as writing to a student's dictation, passing the equipment to the student or adjusting the adapted or special equipment (Anić Kuhar et al. 2007a; Anić Kuhar et al. 2007b).

4.9. Work placement and fieldwork

(Ivan Dolanc and Elizabeta Haničar)

Work placement (work experience, internship, traineeship) and fieldwork are important educational forms at many constituent units of all universities in the Republic of Croatia. At those faculties, students are required to undergo a period of work placement and fieldwork during their university education, spending a certain amount of time working in the profession for which they are being educated in accordance with their study programs (Ordinance Regulating Methods and Conditions of Traineeship, 2007). Work placements and fieldwork provide the students with an opportunity to gain their first practical experiences, and also to get to know the business culture of an institution or company.

Taking into account the specific characteristics of classes and the differences in the university constituents' study programs, each faculty should adopt its own ordinance regulating work placement and fieldwork. Such documents should include students with disabilities and ensure their equal participation in all types of classes. When conducting such classes, each university constituent that is attended by students with disabilities should

ensure equal access to places where work placements and fieldwork are carried out. The success of students with disabilities depends on their getting an adequate assignment in accordance with their psychophysical abilities, but also enabling them to acquire particular professional competencies.

4.9.1. Work placement

Work placement is a planned procedure which begins with the students' being taken on and given their assignments, continues with the fulfillment of their traineeship program, and ends with the evaluation of their work (Ordinance on Student Training and Fieldwork, 2010). The aim of work placement is to enable students to develop the practical aspects and competencies of their profession, to connect the theoretical insights from relevant courses, to experience work without someone else's assistance, and to develop a sense of professionalism and professional responsibility (Ordinance on Student Training, University of Zagreb, 2006). Work placement should enable students to learn and put to practice fundamental approaches, strategies and methods (Ordinance Regulating, University of Zagreb, 2006). Placements are provided by institutions and companies in the area or profession for which students are being educated. This type of learning is common in developed countries, where over 85% of companies use student placement as an important method of recruiting new employees. In developed countries work placements or traineeships refer to part-time jobs in particular professions during university education (www.mojprviposao.net/ jseekerwiki.php?wikiName=StudentPrakse).

The only study program which explicitly recommends that the remuneration for students on work placements should be HRK10 per hour is the graduate study program in Architecture and Urban Planning (Ordinance Regulating Traineeship of Applicants for Graduate Program in Architecture and Urban Planning, 2010).

Work placement can be performed as a part-time or full-time job, where the students have the opportunity to apply their acquired knowledge in practice. Students each have a mentor who trains them and takes care of their progress and who is responsible for them. Work placement provides the students with an easy way to enter the world of employment, and the employers with an opportunity to choose their future employees among the

students (www.mojprviposao.net/jseeker_wiki.php?wikiName =StudentPrakse). For these reasons, we recommend work placements for students with disabilities, as well.

Croatian faculties differ with regard to schedules, mentors, course coordinators, the finding of placements as well as the forms that need to be filled in. The ordinances of some faculties (e.g. Ordinance on Student Training at the Zagreb Polytechnic; Ordinance on Student Training, 2009) state that it is possible to postpone a period of placement in case of unforeseen events, and that an approval is needed for such postponement. However, they also state that student disability should not be a valid reason for the postponement of work placement since it can be the first step towards employment.

When choosing an institution or company for work placement, the accessibility of the building should be assessed. When a student chooses an institution or company for their work placement, they should be informed about the accessibility of the building. It is also necessary to sensitize the employees to the needs of students with disabilities.

Students with disabilities should receive all necessary information about their work placements in a timely manner. Students should be acquainted with the location where they will work. Prior to the placement, the physical accessibility of the building should be assessed. The building should fulfill the conditions laid down by the Ordinance on Premises, Equipment and Professional Employees of an Institution for Professional Rehabilitation (OG 2/06) and the Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility (OG 151/05). An accessible approach and entrance to the building should be ensured. A multi-level building should have elements for overcoming height differences. The width of the clear opening of the entrance door and interior doors should be larger than the width of a wheelchair. Doors and windows should have accessible handles. The width of a hallway should allow simultaneous movement of students in wheelchairs and walking students. The area for movement around furniture should be wider than a wheelchair and allow unassisted and unobstructed movement (see Chapter 9). Furnishings should be within the reach range of students in wheelchairs. The building should have adequate fittings (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility (OG, 151/05)), and should be marked with the international symbol of accessibility. The institution or company where the student is going on work placement should be informed

about the student's specific needs. Students with disabilities should be informed about what the institution or company has to offer to meet their needs.

Instructions on the assignments and aims of the work placement program should be written in standard print (bright letters on a dark surface and a larger font size are recommended) and in Braille.

4.9.2. Fieldwork

The term fieldwork refers to classes and activities which are held outside the university premises (Ordinance on Fieldwork, 2003). Fieldwork is obligatory in some study programs, and it is carried out in accordance with the approved curriculum of those study programs (Ordinance Regulating the Organization and Funding of Fieldwork, 2010). Fieldwork takes different forms (Ordinance on Reimbursement for Fieldwork, 2008a; Ordinance on Reimbursement for Fieldwork, 2008b, Ordinance Regulating the Organization and Funding of Fieldwork, 2010), such as:

a) Field trips lasting several days, during which activities take place the whole day;
b) Out-of-classroom activities lasting a single day;
c) Field exercises in small groups of students.

The number of teachers responsible for the organization and execution of fieldwork depends on the size of the group of students:

- For groups up to 20 students – one teacher;
- For groups up to 40 students – two teachers;
- For groups up to 60 students – three teachers (Ordinance Regulating Reimbursement for Fieldwork, 2008a; Ordinance Regulating Reimbursement for Fieldwork, 2008b; Ordinance Regulating the Organization and Funding of Fieldwork, 2010);
- For groups of more than 60 students – four teachers (Ordinance Regulating the Organization and Funding of Fieldwork, 2010);

If a student with a disability is taking part in fieldwork, the help of a personal assistant should be recommended to the student (and ensured).

The fieldwork supervisor should organize high quality fieldwork, take care of the students' safety, and postpone or cancel the trip in case of unforeseen circumstances (Ordinance on Fieldwork, 2003). Specific needs of students with disabilities are often the reason they are discouraged from participating in fieldwork. However, such discouragement means discrimination of students on the basis of their disability (Anti-Discrimination Act, OG 85/08). This is supported by the Constitution of the Republic of Croatia (OG, 85/10) which states that "everyone shall have access to education under equal conditions".

The instructions, assignments and aims of the fieldwork should be written in standard print (bright letters on a dark surface and a larger font size are recommended) and in Braille. If fieldwork is held out of town, students with disabilities should be given details about the itinerary in written or oral form. It is also recommended that the students should be provided with personal assistants, depending on the students' needs. It is advisable to create a daily plan for field trips of longer duration.

If fieldwork is held during a single day, only the transportation costs are reimbursed (Ordinance Regulating the Organization and Funding of Fieldwork, 2010), in the amount no higher than the price of a second class train or bus ticket (Ordinance Regulating Reimbursement for Fieldwork, 2008a; Ordinance Regulating Reimbursement for Fieldwork, 2008b; Ordinance Regulating the Organization and Funding of Fieldwork, 2010). If students with disabilities are included in the group, accessible transportation should be ensured. For field trips lasting several days, the costs of accommodation and food in a three star hotel are reimbursed in addition to transportation costs (Ordinance Regulating Reimbursement for Fieldwork, 2008a; Ordinance Regulating Reimbursement for Fieldwork, 2008b; Ordinance Regulating the Organization and Funding of Fieldwork, 2010). The physical accessibility of the hotel, its rooms and restrooms should be taken into consideration if the group includes students with disabilities. It is advisable to provide a personal assistant if one is required.

Study programs whose curricula require fieldwork in nature or inaccessible terrain which students with disabilities cannot access due to their impairments should provide activities that involve the same content as the fieldwork, and in which the students can equally participate.

4.10. Libraries

(Zrinka Udiljak-Bugarinovski)

In order to ensure equal opportunities regarding the use of library collections and services for all users, it is necessary to ensure access for students with disabilities to both the exterior and the interior of a library. The Standing Committee of the Library Buildings and Equipment of the International Federation of Library Associations (IFLA 2004; 2006) made a check list for the assessment of library accessibility for persons with disabilities, which is a very useful tool for all types of libraries (the Croatian version is available at http://www.hkdrustvo.hr/hr/izdanja/kategorija/elektronicka). While conducting this kind of assessment, it is recommended that representatives of organizations of students with disabilities or similar organizations should be consulted, as well as users with disabilities. Prior to the implementation of the results of the analysis, it is advisable to include them in the current Croatian laws and standards.

An accessible library is one where adequate accommodations have been made, with regard to:

a) The exterior access to the library: parking place and access to the building in which the library is located; and
b) The library entrance and the interior of the library.

4.10.1. Access to a library

Libraries can be considered accessible for students with disabilities if, in addition to the interior, exterior areas of the library, i.e. access from the road or from the parking place, as well as the entrance to the building are accessible. This includes the application of the principles of universal design (http://www.ncsu.edu/www/ncsu/design/sod5/cud/about_ud/udprinciples.htm) with regard to:

- Ensuring parking accessibility;
- Ensuring accessible approach to the building where the library is located;
- Ensuring accessible approach to the main entrance;

- Ensuring the accessibility of the main entrance (sliding doors are recommended);
- Placing accessibility symbols for the ease of orientation;
- Providing elements of accessibility for overcoming height differences as well as handrails;
- Placing tactile strips and warning strips on the access path leading to the main entrance; and
- Providing additional lights.

4.10.2. Interior of a library and furnishings

It is necessary to provide a safe and barrier-free library entrance for students with disabilities. The interior of the library should be clearly marked, and an orientation plan should be available at the library entrance.

In addition to providing adequate maneuvering space in the entrance area, it is advisable to ensure that the entrance door has a handle which is suitably shaped and positioned. In case of an entrance door with an opening mechanism, the door opener should be within the reach range of students in wheelchairs. All glass doors in the library should have noticeable warning signs. If there is a checkpoint system at the entrance to the library, it should be positioned in such a way to enable unobstructed passage for students who use a wheelchair or other types of mobility aids (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility (OG, 151/05)).

Inside the library, it is important to provide accessible toilets, and to make the interior physically accessible. Access should be ensured to the library collections and services, and several workstations with computers should be accommodated for students with disabilities.

According to the IFLA guidelines (2004; 2006) and the Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility (OG, 151/05), when making accommodations to the library interior, it is advisable to apply the principles of universal design and take into consideration the following:

- If the library is a multi-level building, elements of accessibility for overcoming height differences should be provided;
- Staircases and steps inside the library should be clearly marked by contrasting colors, and equipped with elements of accessibility for overcoming height differences and with handrails on both sides of the stairs;
- The library should have at least one toilet for persons with disabilities;
- Tactile strips and warning strips should be placed to facilitate orientation inside the library;
- It is important to ensure enough maneuvering space for wheelchair users in the library;
- Lighting within the library should be adjustable according to individual needs (for example, by providing additional desk lamps);
- If there is carpeting on the floor, it should be thin and densely woven in order to facilitate the movement of students who use wheelchairs or other mobility aids;
- Doormats should be at the same level as the floor;
- The fire alarm in the library should be both visible and audible;
- The library should provide trained personnel for assisting students with disabilities in case of an emergency; and
- Accessible areas should be marked with accessibility symbols.

The pleasant and accessible library environment greatly depends on the work conditions which are created by accessible furniture and equipment. Today, manufacturers of furniture and equipment offer a wide variety of products intended for different library users. Each student with a disability needs a specific combination of equipment which s/he will find suitable when using a computer. Therefore, gathering information from users is very important, as is consultation on the options provided by the equipment which is being purchased. When choosing furniture and equipment, it is advisable to stick to the principles of universal design (see section 6.1.) or make the necessary accommodations in line with the Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility (OG, 151/05).

It is advisable that the circulation desk and the reference/information desk should be adjustable and have an induction loop system installed to reduce the effect of background noise as well as to improve the sound quality (if the room is larger than 500 m^2; it can be used by more than 100 persons at a time). The desk should be located as close to the entrance area as possible. Its top surface should be within the reach range of persons in wheelchairs (see Chapter 9). Chairs for students with disabilities should be located near the desk. Preferential treatment should be granted to persons with disabilities when queuing. If there is a self-check system, it is necessary to ensure its accessibility for persons with disabilities.

Figure 17 - The photograph shows a self-check system which is within the reach range of students in wheelchairs.

Notice boards should be placed in such a way that their content is within the visual field of students with disabilities (see Chapter 9).

Shelves should be organized in such a way that they are reachable from a wheelchair. The aisle between the shelves should be barrier-free. If the library cannot ensure access to the shelves, assistance should be provided by the library staff.

Figure 18 - Examples of bad and good practice. The photograph shows a barrier-free aisle between the shelves which is wider than 150 cm (good practice). However, the books on the shelves are outside the reach range of students in wheelchairs (bad practice).

When designing a workstation (desks and chairs) in a reading room, ergonomic and anthropometric barriers should be avoided, and sufficient maneuvering space around the furniture ensured. Height adjustable work desks are also suitable for students in wheelchairs.

If the library provides service to hearing impaired users, telecommunications device for the deaf (text telephone) should be made available.

The computer workstations intended for students with disabilities should be accommodated for students with motor impairments. In some cases, it is enough to ensure an adequate area with computer equipment for users with disabilities, and to relocate the keyboard and the screen. If users with disabilities need special hardware and software solutions, the library should provide the suitable assistive technology. This may include accessible keyboards, speech recognition software, alternative mouse options, etc. It is also advisable to ensure technical support and to have library staff trained in showing the patrons how to use the equipment.

Figure 19 - The photograph shows accommodations for students with disabilities made to a workstation in a library.
(http://www.santarosa.edu/library/assets/images/libraries/doyleadastation.jpg).

4.10.3. Accessible library collections

In order for library collections and services to be as accessible as possible to students with disabilities, it is advisable that:

a) The library staff should be acquainted with different types of disabilities in order to know how to treat the patrons;
b) The specific collections intended for persons with disabilities should be easily accessible.

If the library has or can provide a section for persons with reading difficulties, hearing impairments and other impairments, it is advisable to do the following:

- Put up clear signs leading to that section;
- Install tactile strips or colored strips leading to that section of the library;
- Make the area comfortable for sitting, provide good lighting;
- Make sure that there is a CD player or another type of player, and other equipment for the use of audio-visual collections;
- Provide a magnifying glass (preferably with a light), electronic reader or reading magnification machine; and
- Provide computers with a screen adjustment software and software for persons with reading difficulties.

According to the IFLA guidelines (2004; 2006), special services for users with disabilities should be provided in the following cases:

- Home delivery service for users who cannot come to the library;
- Outreach service for persons in institutions and health care facilities; and
- Reading service for patrons with reading difficulties (e.g. short texts, letters, instructions or other text) or scanning texts to make them accessible on computers with screen reader.

Books and information may be provided by means of free postal loans, mobile libraries, the Internet, e-mail, and so on.

4.11. Administrative services

(Zrinka Udiljak-Bugarinovski)

Administrative services of faculties and academies are places which students visit very often during their time at the university. Therefore, it is very important to ensure that they should be accessible, comfortable and efficient. In order for an administrative service to be accessible for students with disabilities, it should be located on the ground floor or, if that is not possible, an elevator, a vertical wheelchair lift or a foldable inclined wheelchair lift should be installed.

Making administrative services accessible requires accommodations to the exterior and entrance areas, as well as adequate adjustments of the interior area. Clear and legible symbols should be put inside and outside the administrative office.

Preferential treatment of students with disabilities should be ensured when they use administrative services.

The entrance to the administrative office should have enough maneuvering space and it should have accessible handles or an automatic door opener. If the entrance door is made of glass, it should have clearly visible warning signs. The maneuvering space inside an

administrative office should allow unobstructed movement of students with disabilities. Tactile strips should be provided leading to the administrative desk, as well as auditory notifications to facilitate orientation of blind and visually impaired students. It is also advisable to have a visual notifications system and other telecommunications devices for the deaf.

The administrative desk should be designed in such a way that it has at least one counter accessible to students with disabilities, that is, within the reach range of students in wheelchairs (see Chapter 9). The desk should have good lighting to accommodate visually impaired students, and enough space for the use of both left and right hands. It is advisable to place a chair near the desk.

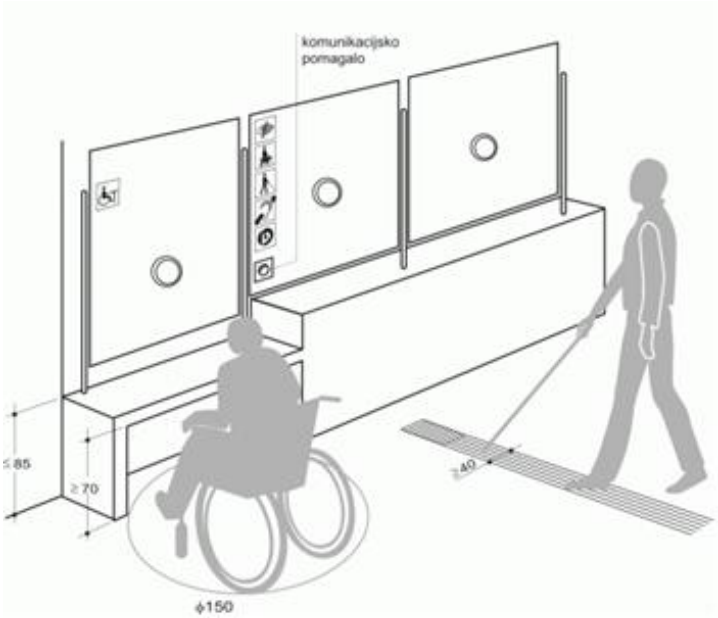

Figure 20 - The illustration shows a possible adaptation of the interior of an administrative office to the needs of students with disabilities. The window in the middle features a communication aid for users with disabilities (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility (OG, 151/05)).

Administrative services often use notice boards for announcements. Notice boards should be within the visual field of students with disabilities, and the announcements should be accessible for students with disabilities (see Chapter 9).

In practice, Studomats - electronic kiosks for the management of general student information - are often located in different parts of the building housing an institution of

higher education. The location of Studomats should be clearly marked, and they should be made accessible for students with disabilities. Access should be provided to a Studomat, with enough maneuvering space for wheelchair users. If the Studomat is located at a different level, elements of accessibility for overcoming height differences (a vertical wheelchair lift, a foldable inclined wheelchair lift or an elevator) should be installed. When purchasing a Studomat, it is important to assess whether it is suitable for use by students with disabilities, or whether it can be upgraded with compatible, assistive technology.

Figure 21 - The photograph shows a Studomat, in front of which enough maneuvering space is provided, but the screen is outside the visual reach of a student in a wheelchair.

If the administrative service uses computers to disseminate information, the equipment and programs should be accessible to students with disabilities. This means that assistive technology should be provided, such as accessible keyboards, speech recognition software with additional equipment such as an USB microphone intended for the use of students who cannot use a standard microphone with headphones without assistance, alternative mouse options (trackball, touchpad etc.), accessible printers, screen magnifier software, and the like. Computers should be accessible to students in wheelchairs.

When ensuring accessibility of administrative services, it is necessary to train the administrative staff in providing assistance to students with disabilities. Accessible

administrative offices and Studomats should be marked with the international symbol of accessibility.

4.12. Sports facilities

(Ivan Dolanc and Elizabeta Haničar)

In addition to the academic and professional content, all study programs at Croatian universities offer courses in physical education. Physical education classes are held in sports halls, at swimming pools and skating rinks, or take form of organized walking tours.

Students with disabilities can be exempt from physical education. The terms and methods of exemption vary from one faculty to another. An example of recommended exemption from physical education will be mentioned later in the text. Exemption can be partial or complete; it can be permanent or temporary (for the current semester only). Students with disabilities can be granted exemption on the basis of their sports activities or their health condition. In the former case, exemptions can be granted to student athletes who practice a sport actively and regularly. Such students must compete at university sports competitions and represent their faculty or university. Health-based exemptions can be granted to students who file a request for exemption on the basis of their health condition. The applications and accompanying documentation needed for exemption are submitted to the physical education teacher, who takes it to the doctor in charge of a particular faculty. The doctor decides on the extent of exemption, and on the methods and content of the physical education curriculum in agreement with the student and the physical education teacher. The revised curriculum is created depending on the health conditions and the diagnosis of each student with a disability (Faculty of Agriculture, 2006).

Teachers often exempt students with disabilities from attending physical education classes against the students' will. The reasons for doing this are the lack of knowledge or awareness, the need for accommodations, inaccessible sports halls or insensitivity. In this way, students with disabilities are discriminated against on the basis of their disability (Anti-Discrimination Act, OG, 85/08) and they are denied the right to access sports (Sports Act, OG, 71/06).

In order to facilitate sports activities at institutions of higher education, student sports associations are established (Sports Act, OG, 71/06). They use the premises of institutions of higher education in order to perform their activities. (Sports Act, OG, 71/06). Since some students with disabilities actively play sports and have an obligation to compete at university sports competitions due to their exemption from physical education, physical education teachers should encourage them to establish dedicated sports associations for students with disabilities.

All student sports associations active at the same institution of higher education get together in a student sports union, which establishes and manages the sporting competition system at their institution (Sports Act, OG, 71/06). Sports associations of students with disabilities can thus join student sports unions, and participate at national and international competitions.

It was mentioned above that most faculties have their physical education classes in sports halls. Sports facilities in general are defined as areas or buildings designed and equipped to fulfill the criteria for the performance of sports activities (Ordinance Regulating the Norms, Standards and Technical Conditions for the Design of Sports Facilities, OG, 38/91). They must meet the general requirements prescribed by regulations for that type of facility, as well as special requirements in accordance with the Sports Act (OG, 71/06).

Entrance areas, (see section 5.1.1.) as well as other areas in a sports facility, should be constructed in such a way as to enable entry and movement of students with disabilities without assistance. The width of the clear opening of the door should be larger than the width of a wheelchair (the average dimensions are 110 × 66 × 90 cm, according to Fejzić 2007) and that wheelchair users should be able to overcome the threshold without assistance (see Chapter 9). In addition, enough space for movement and maneuvering should be ensured. Accessible sports facilities should be marked with the international symbol of accessibility. All equipment, which should be accessible from a wheelchair and which should not obstruct movement, should be wall-mounted, and done in contrast to the floor and walls (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility (OG, 151/05)).

Figure 22 - The photograph on the left shows an accessible entrance to a sports hall, and the one on the right an accessible entrance to a hallway leading to changing rooms and the exercising area.

All sports halls have a designated place for notice boards, where schedules and other information can be posted. Notice boards should be within the visual reach of a wheelchair user (see Chapter 9). Accessible changing rooms, exercising areas, spectator stands as well as toilets should be marked with the international symbol of accessibility.

4.12.1. Changing rooms

When discussing sports halls, changing rooms (locker rooms) are an important topic. It is recommended that the door of a changing room should have the width of the clear opening larger than the width of a wheelchair. Enough maneuvering space and an adequate number of seats should be ensured. Changing room seats should be of the same height as the seat of a wheelchair. If there are clothes hangers above the seats, they should be within the reach range of wheelchair users (see Chapter 9).

Figure 23 - The photographs show changing rooms which are accessible for students with disabilities: the door has a clear width of 90 cm, without a threshold (left), the changing room seats and clothes hangers are accessible (right).

Each changing room has a toilet with a washbasin, and a shower area. Toilets in changing rooms should have enough maneuvering space. In front of the washbasin and the toilet there should be enough space to allow unobstructed access for wheelchair users. For safety reasons, an alarm should be installed with a button or a string (see Chapter 9).

The width of the clear opening of the toilet door should be larger than the width of a wheelchair. The door should open outwards and have an accessible handle. The toilet seat should be of the same height as the seat of a wheelchair. There should be two wall-mounted grab rails next to the toilet (see Chapter 9).

The toilet should contain a wall-mounted washbasin, with a siphon placed inside the wall or right next to it. The tap should be a single lever mixer or a built-in sensor tap (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Toilets should have a separate entrance for women and men. There should be a tactile strip leading from the entrance door of the building to the toilets, with grooves pointing in the direction of movement (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

The shower area should have a surface area below the shower which is larger than a wheelchair, and there should be grab rails. It should have a non-slip surface and a slope for drainage, with no threshold and no partitions. The shower area should have a waterproof folding seat fitted at the same height as the seat of a wheelchair. The tap should be a single lever mixer or a sensor tap. A soap holder should be placed within the reach range of a wheelchair user (see Chapter 9).

5.12.2 Exercise area

The exercise area is an essential part of every sports hall. Considering the multifunctional character of the space, accessibility has to be taken into account. If the entrances into the exercise area include height differences, the use of access ramps, elevators, foldable inclined wheelchair lifts and vertical wheelchair lifts is recommended. The entrance door into the exercise area should be wide enough and with a low threshold, enabling independent movement of wheelchair users (see Chapter 9).

When purchasing sports and gym equipment, the principles of multi-functionality and universal design should be adhered to. The equipment should be accessible to persons with and without disabilities; otherwise the former group are discriminated against on the basis of disability (Anti-Discrimination Act, OG, 85/08; Sports Act, OG, 71/06).

In every sports hall, there are lines delineating courts for different sports. It is recommended that the lines should be 4–5 cm wide, in noticeable colors (Wouters, Rutigliano and Verbraeke 2005). In view of the fact that a number of students and athletes with disabilities are blind, tactile markings strips are also recommended. They should be 0.3 cm +/- 0.05 thick (International Blind Sports Federation, 2006).

As athletes with disabilities practice specific sports, it is recommended that sports halls should have marked courts for those sports too. One such sport is sitting volleyball. The dimensions of a sitting volleyball court are 10 × 6 m, and the net heights are 115 cm for men and 110 cm for women. The dimensions of a court for five-a-side football (futsal for blind students) are 38–42 m in length and 18–22 m in width. Along the length of the court, there

should be a protective barrier 1–1.20 m high, with a slope of 10 degrees (sloping away from the court) (http://sdsks.page.tl/Nogomet.htm). The dimensions of a court for seven-a-side football (usually for students with motor impairments) are 25–42 m in length and 15–20 m in width. Goal dimensions are 3 × 2 m. The dimensions of a court for wheelchair hockey are 26 × 16 m. The goal is 250 cm wide, 20 cm high and 40 cm deep. The protective barrier is 20 cm high. Court size may vary: the minimum dimensions are 24 m in length and 14 m in width, whereas the maximum dimensions are 26 m and 16 m. The corners of the court are rounded. Barrier height may also vary: the minimum height is 9 cm, while the maximum is 50 cm (Wouters, Rutigliano and Verbraeke 2005). Court lines for goalball (for blind students) should be 5 cm wide (+/- 1 cm) and have visual and tactile strips for the orientation of players. The goal is 9 m wide (+/- 5 m) and 130 cm high (+/- 2 cm). The maximum diameter of the goal posts and the crossbar should not exceed 15 cm (International Blind Sports Federation, 2006).

5.12.2.1 Sports equipment

In order for students with disabilities to actively and equally participate in physical education classes, in addition to physical accessibility, appropriate equipment should be ensured for specialized sports intended for students with disabilities.

Equipment can be categorized according to the athletic activity in question: gymnastics, athletics, football, volleyball, basketball, team handball, badminton, tennis and table tennis, with balls forming a separate category (Adria sport, 2010). Sports equipment with auditory cues is recommended for visually impaired students. If there is an instruction manual, it should be written both in Braille and in standard print (bright characters on a dark background and a large font). Hearing-impaired students do not require special accommodations, except in cases of equipment with sound notification, which should also have visual cues. Students with motor impairments may require equipment of suitable dimensions and weight.

Equipment for students with disabilities includes audible balls, balls of different sizes and colors, balls of different weights, balls for psychomotor development (e.g. Swiss ball),

batons, hoops, pins, jump ropes, balance boards, rope ladders, stall bars, trampolines, mats, tatami mats for judo/karate, punching bags, table tennis paddles (Adria sport, 2010).

Some sports halls have a gym. The gym should be physically accessible (including elements for overcoming height differences, accessible entrances, and no thresholds). When purchasing sports and gym equipment, the intended users should be considered. It is also important to adhere to the principles of anti-discrimination, multi-functionality and universal design. Gym equipment should be designed so that it follows body movement during various exercises. Beginners and students with disabilities certainly require such an approach. Exercisers should be accessible, comfortable and adjustable to the height and weight of the user. Their angles should be adjustable to every muscle. Every weight shift on the exerciser should be safe for the user (http://www.stylefelix.com/hoist-fitness-systems--info-1490.aspx). The following gym equipment is recommended: therapy bicycles, exercise bicycles and elliptical trainers, multi-gym machines and benches (http://www.upit-os.hr/fitnes%20studio%20%28za%20upit-os.hr%29/oprema.html).

5.12.3 Auditorium

It is very important to enable students with disabilities to easily access the auditorium by providing wider aisles and more maneuvering space. The layout dimensions of the wheelchair space in the auditorium should be larger than a wheelchair and marked with the international symbol of accessibility (see Chapter 9). When providing wheelchair space, access to it should also be taken into account. The space should be on the same level as the entrance. If there is a level difference, an element for overcoming height differences should be provided (an elevator, ramp, foldable inclined wheelchair lift or a vertical wheelchair lift).

In every auditorium, a specific number of wheelchair spaces should be provided relative to the total number of seats. If there are 100 to 300 fixed seats, two accessible wheelchair spaces should be provided. If the number of fixed seats ranges from 301 to 1000, there should be at least 2% of accessible wheelchair spaces, and if the total number of fixed seats is 1001 or more, there should be at least 1% of accessible wheelchair spaces

(Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

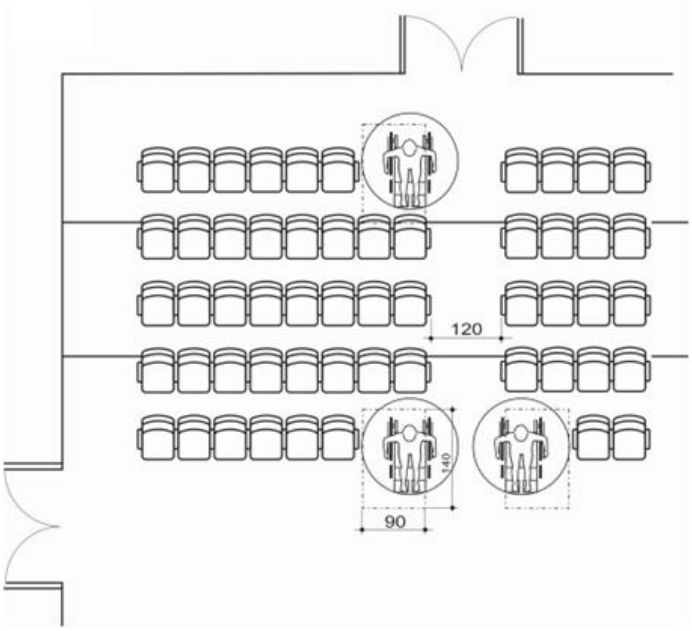

Figure 24 - The illustration shows wheelchair spaces in an auditorium (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

5.13 Student clubs and counseling centers

(Asja Barić)

The role of student clubs is to provide a place for students to socialize in their spare time, and to organize various activities and events. Student counseling centers are intended for students who need some kind of psychological help, advice or support in dealing with the everyday challenges of student life in order to make their education easier and more efficient (Convention on the Rights of Persons with Disabilities, 2006).

In Croatia, there are various student clubs and counseling centers. In Zagreb, the clubs are organized within faculties, for example the Student Club of the Faculty of Humanities and Social Sciences (KSFF), the Student Club of the Faculty of Electrical Engineering and Computing (KSET), the Student Club of the Faculty of Graphic Arts (KSGF), etc. In Rijeka, there is the Club of English Language Students of the Faculty of Humanities and Social Sciences (SKAR). In Split, there are student clubs “Spin” and “Munja”, among others. The long-awaited club “Božo Lerotić” has been recently founded in Zadar.

The Department of Psychology of the Faculty of Humanities and Social Sciences in Zagreb runs a student counseling center. The Rijeka Student Counseling Center offers psychological support to students of the University of Rijeka, while in Zadar students can get help in the counseling center UNIPU within the Faculty of Humanities and Social Sciences.

Student clubs, counseling centers and other spaces of similar function should not pose accessibility problems which will cause low attendance of students with disabilities. The access to the club or counseling center, the entrance area, the furnishings and other elements should be adjusted to accommodate students with disabilities. The attitude of the staff is also important for the students to feel comfortable.

It is recommended that clubs and counseling centers should be situated on the ground floor in order to be accessible to students with disabilities. Otherwise, an elevator, ramp, escalator, foldable inclined wheelchair lift or vertical wheelchair lift should be provided.

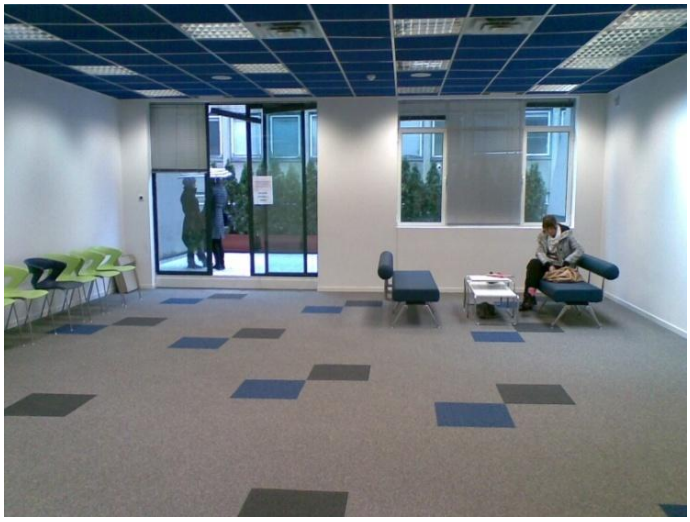

Figure 25 - The photograph shows the interior of a student club which is spacious and accessible to students with disabilities.

The entrance area should be wide enough to allow unobstructed movement of students with motor impairments, as well as visually impaired students who use the help of a guide dog or a seeing guide. The entrance door should be a swing door or a sliding door which is easy to open and whose clear opening should be wider than a wheelchair (see

Chapter 9). The door should be clearly marked. All accessible rooms should be marked with the international symbol of accessibility (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

The maneuvering space should have appropriate dimensions to enable unobstructed movement, and it should also be free of vertical barriers such as tables, chairs, etc. The space for unobstructed movement around the furniture should be wider than a wheelchair (see Chapter 9).

Figure 26 - The photograph shows the interior of a student club which is spacious enough for unobstructed maneuvering.

Access to the seating area should be wide enough and unobstructed. When necessary, an assistant should be provided to help the student get from the entrance to a club or counseling center to the seating area. The space should allow unobstructed movement of visually impaired students who use the help of a guide dog or a seeing guide.

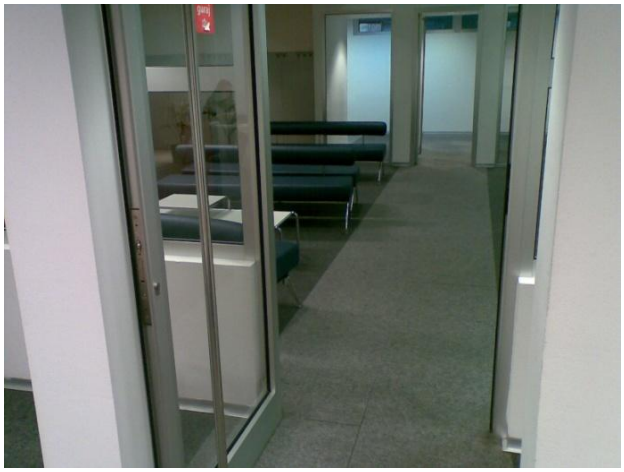

Figure 27 - The photograph shows an entrance wide enough for unobstructed movement of students with disabilities.

In the interior, an area with tables and chairs should be provided for students in wheelchairs and visually impaired students who use the help of a guide dog or a seeing guide. The top surface and underside of the desk should be within the reach range of a student in a wheelchair, and the desk should have enough knee space. Windows and doors should have accessible handles which should be appropriately shaped, easy to open and located within the reach range of a student in a wheelchair (see Chapter 9). Hearing-impaired students do not require accessibility modifications. However, it is recommended that a seat should be ensured for them and their interpreter or notetaker (if they have one).

For unobstructed movement, it is recommended that the seats should be placed on the same level as the entrance. Otherwise, a ramp should be provided. The seats should be appropriately shaped, with sufficient space between them. For easier access, it is recommended that the student should be seated as close as possible to the entrance or to the desk of a clerk, counselor or club manager. Blind or visually impaired students and students with motor impairments should be provided with a desk which is adjusted to their needs (desk height, space between the desk and the chair, etc.) and located near the desk manned by a staff member. It is also recommended that a working area should be provided, with computers accessible to students with disabilities. There should be enough space for a wheelchair next to the desk manned by a staff member. Deaf students should be provided with enough space on the wider side of the desk so that they can be seated close to the staff

member for easier communication (in particular if they are not accompanied with an interpreter or notetaker).

Tactile strips and tactile warning strips should lead from the entrance to the student club or counseling center (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05). It is recommended that blind or visually impaired students should familiarize themselves with the environment, either alone or with their peripatologist, before using the services of the club or center.

Both visual and sound alarms are imperative in the event of evacuation (for more information on emergency evacuation plans, see section 5.6).

5. Universal design and its use in higher education

(Nataša Pavlović)

Universal design means the design of products, environments, programs and services to be usable by all people to the greatest extent possible without the need for adaptation or specialized design (Convention on the Rights of Persons with Disabilities, 2006). The concept of universal design, and its related concepts "inclusive design" and "design for all" developed in parallel in different parts of the world: Scandinavia, the United States, the United Kingdom, etc. All those developments were summarized in the Stockholm Declaration adopted in 2004 at the general meeting of the European Institute for Design and Disability (EIDD). The Stockholm Declaration describes universal design as "design for human diversity, social inclusion and equality", a "holistic and innovative approach [which] constitutes a creative and ethical challenge for all planners, designers, entrepreneurs, administrators and political leaders" (http://www.designforalleurope.org/Design-for-All/EIDD-Documents/Stockholm-Declaration/).

Figure 47 - The illustration shows different people - a child, a pregnant woman, a person pushing a baby pram, an elderly person, a person in a wheelchair and a person carrying luggage - all of whom benefit from universal design (http://www.norskdesign.no/design-for-all/design-for-all-inclusive-design-article3698-8530.html).

The aim of universal design is to enable all people to have equal opportunities to participate in every aspect of society (http://www.designforalleurope.org/Design-for-All/EIDD-Documents/ Stockholm-Declaration/). Universal design creates environments, products and services with the aim that everybody - including future generations, regardless of age, gender, capacities or cultural background - can participate in the construction of society, with equal opportunities, being able to participate in social, economic, cultural and leisure activities in an autonomous way (Design for All Foundation, 2006).

To achieve this, the built environment, everyday objects, services, culture and information – in short, everything that is designed and made by people to be used by people – must be accessible, convenient for everyone in society to use and responsive to evolving human diversity (http://www.designforalleurope.org/Design-for-All/EIDD-Documents /Stockholm-Declaration/). The practice of Design for All makes conscious use of the analysis of human needs and aspirations and requires the involvement of end users at every stage in the design process (http://www.designforalleurope.org/Design-for-All/EIDD-Documents/Stockholm Declaration/). At the same time, universal design does not exclude assistive devices for particular groups of persons with disabilities where this is needed (Convention on the Rights of Persons with Disabilities, 2006).

The principles of universal design are the result of collaboration among architects, product designers, engineers and environmental design researchers, as a guide to designing environments, products and communications. They can also be applied to evaluate existing

designs, guide the design process and educate both designers and consumers about the characteristics of more usable products and environments (http://www.ncsu.edu/www/ncsu/design/sod5/cud/about_ud/udprinciples.htm).

The text that follows lists and describes the seven principles of universal design. It should be borne in mind that not all guidelines may be relevant to all types of design.

6.1. The principles of universal design

(http://www.ncsu.edu/www/ncsu/design/sod5/cud/about_ud/udprinciples.htm)

PRINCIPLE ONE: Equitable Use

The design is useful and marketable to people with diverse abilities.

Guidelines:

1a. Provide the same means of use for all users: identical whenever possible; equivalent when not.

1b. Avoid segregating or stigmatizing any users.

1c. Provisions for privacy, security, and safety should be equally available to all users.

1d. Make the design appealing to all users.

Figure 28 - The photograph shows an example of universal design, a stair/ramp - "Stramp" - designed by Cornelia Oberlander and Arthur Erikson. The stair/ramp is situated in Vancouver, and is accessible to everyone (http://accessibility-fail.dreamwidth.org/1101.html).

Figure 29 - The photograph shows a single lever mixer tap which can be easily used by a large number of persons regardless of their motor abilities.

PRINCIPLE TWO: Flexibility in Use

The design accommodates a wide range of individual preferences and abilities.

Guidelines:

2a. Provide choice in methods of use.

2b. Accommodate right- or left-handed access and use.

2c. Facilitate the user's accuracy and precision.

2d. Provide adaptability to the user's pace.

PRINCIPLE THREE: Simple and Intuitive Use

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

Guidelines:

3a. Eliminate unnecessary complexity.

3b. Be consistent with user expectations and intuition.

3c. Accommodate a wide range of literacy and language skills.

3d. Arrange information consistent with its importance.

3e. Provide effective prompting and feedback during and after task completion.

PRINCIPLE FOUR: Perceptible Information

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

Guidelines:

4a. Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.

4b. Provide adequate contrast between essential information and its surroundings.

4c. Maximize "legibility" of essential information.

4d. Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).

4e. Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

Figure 30 - The photograph shows a TV remote control which is ergonomically shaped, with clear and noticeable buttons containing text, symbols and tactile signs for the blind and visually impaired.

PRINCIPLE FIVE: Tolerance for Error

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

Guidelines:

5a. Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.

5b. Provide warnings of hazards and errors.

5c. Provide fail safe features.

5d. Discourage unconscious action in tasks that require vigilance.

PRINCIPLE SIX: Low Physical Effort

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

Guidelines:

6a. Allow user to maintain a neutral body position.

6b. Use reasonable operating forces.

6c. Minimize repetitive actions.

6d. Minimize sustained physical effort.

Figure 31 - The illustration shows a slanted drum washing machine which can be used by maintaining a neutral body position with minimum effort (http://www.designforall.in/newsletter_june_2007.pdf).

PRINCIPLE SEVEN: 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:

7a. Provide a clear line of sight to important elements for any seated or standing user.

7b. Make reach to all components comfortable for any seated or standing user.

7c. Accommodate variations in hand and grip size.

7d. Provide adequate space for the use of assistive devices or personal assistance.

Figure 32 The photograph shows an accessible kitchen worktop. All the elements are within the easy reach of both sitting and standing users (http://www.tuvie.com/hability-easyfood-and-valcucine/).

These principles offer designers guidance to better integrate features that meet the needs of as many users as possible. Of course, design involves more than consideration of usability. Designers must also incorporate other considerations such as economic, engineering, cultural, gender and environmental concerns in their design processes (http://www.ncsu.edu/www/ncsu/design/sod5/cud/ about_ud/udprinciples.htm).

Integrating the principles of universal design into the earliest stages of planning is far more cost effective than the introduction of adjustments after the product (object, building, environment) is already finished. It can be said that the aim of universal design is to overcome at source many of the obstacles that mankind has illogically created, in both

mental attitudes and the resulting artificial environment (http://www.designforalleurope.org/About-EIDD/).

Accessible objects, buildings and environments that are easy to use improve the quality of life for everyone, not just the elderly or disabled (http://www.designforalleurope.org/Design-for-All/EIDD-Documents/Stockholm-Declaration/). The application of the principles of universal design in the planning of environments, buildings and objects related to higher education at Croatian universities would make life easier not only for students with disabilities but for *all* students, as well as the teaching and non-teaching staff.

7. Conclusion

(Elizabeta Haničar)

Physical barriers hinder the integration of persons with disabilities into everyday life. Difficulties in overcoming architectural elements independently point to the existence of physical barriers (Fejzić, 2007). Unfortunately, a systematic process of rendering public and residential buildings, as well as public transport, accessible to persons with disabilities has not completely taken hold in Croatia yet (National Strategy for a Uniform Policy for Persons with Disabilities from 2003 to 2006, OG, 13/03). It is clear that the current situation at Croatian universities is not particularly favorable to students with disabilities. On a daily basis, students with disabilities often face obstacles that hinder their equal participation in higher education and, at the same time, affect their social life. It is necessary to increase investments in education and decentralize the management of the education system. In other words, financial resources should be allocated equally to all universities. Lately, increased efforts have been made to eliminate the existing barriers from the physical environment and thus enable equal participation for all (National Strategy for a Uniform Policy for Persons with Disabilities from 2003 to 2006, OG, 13/03). By creating an environment that is safe, user-friendly and accessible to all students, we acknowledge diversity among the students and accept students with disabilities as equal members of the academic community, thus enhancing the quality of education and thereby also the quality of life.

A large number of international and national documents state the responsibility of providing opportunities for students with disabilities to participate in regular education (The Council of Europe Action Plan to promote the rights and full participation of people with disabilities in society: improving the quality of life of people with disabilities in Europe 2006 – 2015) under the same conditions and in accordance with their abilities (The Constitution of the Republic of Croatia, OG, 85/10), whether in the form of support, architectural adaptation (The Council of Europe Action Plan to promote the rights and full participation of people with disabilities in society: improving the quality of life of people with disabilities in Europe 2006 – 2015; Convention on the Rights of Persons with Disabilities, 2006), reasonable accommodations (Convention on the Rights of Persons with Disabilities, 2006) or adjustment of materials (The Council of Europe Action Plan to promote the rights and full participation of people with disabilities in society: improving the quality of life of people with disabilities in Europe 2006 – 2015; Convention on the Rights of Persons with Disabilities, 2006). In this context, it should be mentioned that new domains, such as accessibility for persons with allergies, should also be considered within the framework of physical accessibility.

The aim of the National Strategy for a Uniform Policy for Persons with Disabilities from 2003 to 2006 (OG, 13/03) is to increase the opportunities for participation and to improve quality assurance in higher education. In order to achieve this, it is necessary to ensure the following (National Strategy to Create Equal Opportunities for Persons with Disabilities from 2007 to 2015, OG, 63/2007):

- Access to buildings for students with disabilities;
- Accessibility of public transportation;
- Use of assistive technology;
- Various forms of assistance in communication of students with disabilities;
- Development of universal design.

Making universal design the aim will create a safe and accessible environment, encouraging independence. Physical accommodations increase independence; it is, therefore, very important to appropriately and clearly mark all accessible buildings and environments and to place signs pointing to them.

If we do not eliminate obstacles, we make students with disabilities dependent on others, which violates their basic human rights. Demanding too much and giving too little, we cause their increased dependence and social isolation. Difficulties encountered in the application of current regulations are the result of inadequate allocation of resources to education, poor physical and material conditions, architectural barriers, negative attitudes and insufficient and inadequate equipment and aids (National Strategy for a Uniform Policy for Persons with Disabilities from 2003 to 2006, OG, 13/03).

A serious problem is also the lack of training and awareness, resulting in a lack of consideration for the specific needs of students with disabilities on the part of the teaching and non-teaching staff. The reasons for this lack of awareness may lie with the public, but it can also stem from mutual isolation. To what extent is the social community responsible and ready to change its prevailing attitudes? How can the public be made more aware of these issues, and whose responsibility is it? It is difficult to answer the first question; however, communication, positive examples and experiences are some of the ways to raise public awareness. Students with disabilities themselves, along with professional services, are responsible for making the teaching and non-teaching staff more perceptive of their needs. By standing up for themselves, students with disabilities help raise public awareness. They can eliminate prejudice and change attitudes by setting a positive example and by equally participating in higher education.

Equal opportunities for students with disabilities have not been fully implemented and there is a lot of room for improvement. This handbook is a step in that direction.

8. Glossary

Anthropometric barrier is a barrier which prevents and/or hinders interaction with the environment. It occurs when human measurements are not taken into account.

Anthropometry is an anthropological method used for measuring the human body, its parts and functional abilities. Ergonomics uses anthropometric data with the aim of designing

optimum shapes and dimensions of environment and products which are adjusted to the anthropometric features of human beings (Mikšić, 1997).

Audio frequency induction loop (AFIL) is a loop of wire built into a building in order to eliminate background noises and improve the quality of sound. It is installed in halls larger than 500 m², i.e. halls which can accommodate more than 100 people and which use loudspeakers for sound transmission (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Auditory signals are signals which help blind and visually impaired persons in orientation.

Barrier is an obstacle which can prevent and/or hinder a person's unobstructed access, movement, stay, work, etc. (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Communication aid is a device which enables persons with disabilities who use a hearing aid to receive audio signals without any interference (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Discrimination is unfavorable treatment of an individual and of persons who are related to that individual. Discrimination also refers to unfavorable treatment of a person because of an unfounded belief that there exist grounds for discrimination. Discrimination can be direct or indirect. Direct discrimination occurs where one person is treated less favorably than another is, has been or would be treated in a comparable situation. Indirect discrimination occurs where an apparently neutral provision, criterion or practice puts or could put a person at a particular disadvantage compared with other persons, unless that provision, criterion or practice is objectively justified by a legitimate aim and the means of achieving that aim are appropriate and necessary (Anti-Discrimination Act, OG, 85/08; European Council Directive 2000/43EC).

Discrimination on the basis of disability means any distinction, exclusion or restriction on the basis of disability which has the purpose or effect of impairing or nullifying the recognition, enjoyment or exercise, on an equal basis with others, of all human rights and fundamental freedoms in the political, economic, social, cultural, civil or any other field (Convention on the Rights of Persons with Disabilities, 2006).

Elements of accessibility are elements used for overcoming height differences (ramp, staircase, elevator, vertical wheelchair lift, foldable inclined wheelchair lift) and for making the environment accessible for independent living (accessible approach, route of travel, toilet, bathroom, kitchen, bedroom, classroom, working space, apartment, bar, restaurant, shower stall, auditorium, telephone, text telephone, fax machine, ATM, electrical outlet, light switch), which also includes accessible public transport (bus/tram stop, railway/bus platform, parking space, pedestrian space, traffic light, pedestrian crossing, pedestrian island, intersection) (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Emergency evacuation chair is a type of chair used for evacuating persons with motor impairments in emergency situations, such as a fire in the building. The chair is designed so that persons with motor impairments can be carried down the staircase more safely than in a wheelchair.

Equalization of opportunities means the process through which the various systems of society and the environment are made available to all, particularly to persons with disabilities. The principle of equal rights implies that the needs of each and every individual are of equal importance, that those needs must be made the basis for the planning of societies and that all resources must be employed in such a way as to ensure that every individual has equal opportunity for participation (Standard Rules on the Equalization of Opportunities for Persons with Disabilities, 1993).

Ergonomic barrier is a barrier which prevents or hinders the use of equipment or furnishings. It occurs when anthropometric data are not taken into account.

Ergonomics is the study of the interaction of humans with their working environment. It uses scientific data in order to develop methods and design environment with the aim of relieving, eliminating or reducing fatigue and pain, as well as increasing safety and effectiveness (http://www.medicina.hr/clanci/ergonomija.htm).

Foldable inclined wheelchair lift is one of the elements for overcoming height differences greater than 120 cm in the interior or exterior. It is fitted onto the walls along the staircase or onto the staircase railing which runs along the entire staircase. The minimum size of the

tread of the lift is 90 × 100 cm. The curved safety arms and the folding handrail should be set at a height of 20 cm. An accessible foldable inclined wheelchair lift should be marked with the international symbol of accessibility (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Ground plan for orientation is the ground plan of a building aimed at facilitating orientation in and movement around the building. It should be located inside the building, near the entrance: horizontally, at a maximum height of 90 cm, or vertically, with its top edge at a maximum height of 180 cm. It should contain information in Braille. A tactile strip 40 cm wide, with grooves pointing in the direction of movement, should lead from the entrance of the building to the ground plan. The ground plan for orientation should have a raised tactile surface and it should be marked with the international symbol of accessibility (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Height difference (or **level difference** or **elevation change**), as the term suggests, is a difference in height (for example, the difference between the ground floor and the first floor of a building). Elements of accessibility, such as ramps, staircases, elevators, foldable inclined wheelchair lifts and vertical wheelchair lifts can be used for overcoming height differences.

Horizontal barrier is a barrier which prevents continuous movement (e.g. a door or passage that has a clear opening less than 80 cm wide). It occurs when the clear opening width necessary for unobstructed horizontal movement is not taken into account.

International symbol of accessibility (or **international symbol of access**, **ISA**) is a symbol which marks the required element of accessibility. Required elements of accessibility are those elements of design and construction which are used to define the size, properties, fittings, appliances and other equipment of a building in order to ensure that persons with disabilities and reduced mobility have equal conditions of access, movement, stay and work as others (Ordinance Ensuring Access to Persons with Disabilities and Reduced Mobility, OG, 151/05).

Maneuvering space is the space a person needs for unobstructed movement. An adult requires 60 × 60 cm, a blind or visually impaired person requires 120 × 120 cm, and a person in a wheelchair requires 150 × 150 cm. Maneuvering space should have the appropriate

dimensions for unobstructed maneuvering and it should be free of barriers such as tables, chairs, etc.

Mobility denotes the ability to move. The word is frequently used, and in the context of visually impaired persons it encompasses two concepts: orientation and movement.

Peripatologist is an expert for the orientation and mobility of visually impaired persons.

Personal assistance denotes assistance to persons with disabilities in those activities they would do alone if they did not have a sensory, physical or intellectual impairment (Ratzka, 1997; cited in Biškup, Buljevac and Leutar, 2009).

Personal assistant is an assistant who performs some activities or tasks for a student (or any other person) with a disability in such a way as the student would if s/he could (Biškup, Buljevac, Leutar, 2009). The main aim of introducing the occupation of a personal assistant is to improve the quality of life of persons with disabilities. A personal assistant should be in the age range between 18 and 65. Personal assistants are only helpers, and they should perform the tasks strictly in the way a person with disabilities would. “Personal” denotes that users decide what kind of help they will request from the assistant, who the assistant will be, as well as when and how the assistance will be provided. In Croatia, a personal assistant must be an unemployed person who has either finished elementary school and has taken a nursing course or who has finished secondary school.

Quality of higher education represents a multi-dimensional, multi-level, dynamic concept which refers to the contextual provisions of an educational model, aims and goals of an institution and the specific standards of a particular system, educational institution, study program or scientific field (AZVO; cited in Sinković, Sinković, 2008).

Ramp is an element for overcoming height differences of up to 120 cm in the interior or exterior. The maximum permitted ramp slope is 5%. The minimum clear width of the ramp is 120 cm in the exterior and 90 cm in the interior. The landing should be at least 150 cm long and placed at intervals of 6 m along the length of the ramp. The surface of the ramp should be slip-resistant. A handrail that is easy to grip should be placed at unprotected parts of the ramp. The railings should be placed at the heights of 60 cm and 90 cm, with curved-end extensions of 30 cm beyond the tread of the ramp. The ramp should be marked with the

international symbol of accessibility (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Reasonable accommodation means necessary and appropriate modification and adjustments not imposing a disproportionate or undue burden, where needed in a particular case, to ensure to persons with disabilities the enjoyment or exercise on an equal basis with others of all human rights and fundamental freedoms (Convention on the Rights of Persons with Disabilities, 2006).

Route of travel (or **path of travel**) is a path or passage which connects the entrance to a building with other rooms or areas in that building. It is recommended that all passages have a minimum width of 150 cm, and that all routes of travel are on the same level. The routes that are on different levels should be connected by elements for overcoming height differences. All doors along the route of travel should have a minimum clear opening width of 90 cm, an accessible handle and no threshold. Entrance doors which open from the route of travel into other rooms should have a threshold less than 2 cm high. Fittings and other equipment wider than 10 cm should be installed and/or placed into wall niches. Appropriate electrical outlets and light switches should be provided. An accessible route should be marked with the international symbol of accessibility (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Sensory barrier is a barrier that prevents active participation of persons with visual or hearing impairments (e.g. signs or notices that are solely auditory or solely visual). This type of barrier occurs when the needs and abilities of persons with visual and hearing impairments are not taken into account.

Slip-resistant surface (or **non-slip surface**) is a surface that does not retain water and it increases both the coefficient of friction and slip resistance. Most ceramic tiles are not slip resistant when exposed to moisture. All tiles, including those classified as slip-resistant, lose their natural friction property, a phenomenon known as polymerization. Potentially dangerous slippery surfaces include: kitchen floors, bathroom floors, bathtubs, showers, entrance areas, ramps, locker rooms, stairs or steps, etc. (http://att-stop.hr/gdje-trebam-protukliznu-zastitu/).

Sound notification is a sound warning and notification for blind and visually impaired persons.

Tactile strip is a raised tactile part of the route of travel that has the function of guiding blind or visually impaired persons. The end of the path and all changes in direction are indicated by a change in the structure of the textured area. Tactile strips have a particular width and grooves pointing in the direction of movement (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Tactile surface is a walking surface whose top layer has a tactile treatment. It includes tactile strips, tactile warning strips and tactile warning surfaces. It has raised patterns of up to 5 mm high which do not obstruct the movement of a wheelchair and are detectable by foot or cane. It does not retain water, snow and dirt, and it is easy to maintain. Tactile strips, tactile warning strips and tactile warning surfaces must have the properties prescribed for tactile surfaces (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05). Their aim is to facilitate the orientation, guiding, warning and informing of blind or visually impaired persons.

Tactile surface treatment is the tactile treatment of the top layer of the route of travel (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Tactile warning strip is a raised tactile part of the route of travel which has the function of warning blind or visually impaired persons of danger.

Tactile warning surface is a raised tactile part of the route of travel which has the function of warning and informing blind or visually impaired persons of the changes in level and direction. It has a particular width and grooves placed vertically in relation to the direction of movement.

Text telephone is intended for persons who have a severe hearing impairment and are not able to use a regular telephone. Text telephones are mostly used by deaf persons, but may also be used by the hard of hearing and the deafblind. Traditional text telephones look like small electronic typewriters or keyboards with a small screen on which a person can read the text sent by the person on the other end of the line. In order to ensure the wider use of

text telephones, relay centers mediate in the communication between a deaf person with a text telephone and a hearing person with a regular telephone. The speed of conversation is almost equal to the speed of two hearing persons talking on the telephone. Today, fax machines, the internet and mobile phones are used instead of text telephones (Tarczay et al. 2006).

Universal design is design for everyone. It takes human diversity into account and promotes the inclusion of all people into all daily activities. It includes people of all ages and abilities. The basis of universal design is the philosophy of accessibility, which is based on the recognition, acceptance and promotion of all human rights.

Vertical barrier is a barrier which makes height (level) differences or elevation changes difficult to overcome. Staircases and thresholds are examples of such barriers. This type of barrier occurs in case of level differences that have not been overcome with an element for overcoming height differences.

Vertical wheelchair lift is an element for overcoming height differences greater than 120 cm in the interior or exterior. The minimum size of the tread is 110 × 140 cm. The lateral sides of the lift are closed up to the height of 120 cm. The entrance door should be a sliding door or a swing door which opens outwards, and it should have a clear opening width of 90 cm. An accessible vertical wheelchair lift should be marked with the international symbol of accessibility (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Visual alarm (or **visual alert**) is a warning system for hearing-impaired persons by means of light signals.

Wall-mounted means attached to the wall.

Wheelchair is an orthopedic aid which helps immobile persons or persons with mobility impairments to move around. Wheelchairs are made in three sizes: small, medium and large. The standard medium wheelchair is most frequently used. This type of wheelchair is 110 cm long, 66 cm wide and 90 cm high. The seat is placed at a height of 50 cm and the armrests at 75 cm. When the wheelchair is folded, its width is reduced to 31 cm. A wheelchair weighs about 23 kg (Fejzić, 2007).

9. Recommended Construction Standards for Physical Accessibility

Accessible approach (**access route** or **access path**) should be at least 100 cm wide in order to allow unobstructed passage, with at least 20% of the clear floor space (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Bathtub should have a maximum height of 50 cm. A bathtub lift and grab bars should be placed by the bathtub at a height ranging from 80 to 90 cm (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Chairs should meet the following criteria: the seat should be at a maximum height of 45 cm, measuring 40 x 40 cm, with the back rest at the height of 50 cm (Neufert and Neufert 2000).

Counter should include at least one window accessible to persons with disabilities: its top edge should be at a height of 80 cm and it should have an accessible approach at least 120 cm wide (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Door handle should be appropriately shaped, in high contrast to the door and placed at a height of 90 cm (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Electrical outlets, light switches and doorbells are considered accessible if they are placed at a height ranging from 90 to 120 cm, and if there is an intercom with a light indicator placed at a height of 120 cm. All fittings and fixtures protruding by more than 10 cm should be built in, or installed in wall niches (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Elevator should have an interior measuring 110 × 140 cm and a door that is at least 90 cm wide. The elevator door should be a slide door or it should open outwards. The call panel and controls should be placed at a height ranging from 90 to 120 cm. The floor numbers and other information should be in high contrast, in raised lettering and in Braille. The handrails

in the elevator should be set at a height of 90 cm. There should be both visible and verbal or audible door opening/closing and floor indicators. A tactile strip at least 40 cm wide, with grooves pointing in the direction of movement, should lead from the entrance of the building to the elevator. An accessible elevator should be marked with the international symbol of accessibility (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Entrance door should be a swing or sliding door which is easy to open, and it should have a clear opening width of at least 90 cm. Unobstructed passage is ensured by installing a single door with a clear opening width of at least 110/210 cm, or a double door with a clear opening width of at least 2 × 90/210 cm. All interior doors should have a clear opening width of at least 80 cm. An accessible door should not have a threshold higher than 2 cm. When doors and partition walls are made of glass panes larger than 1.5 m^2 without grills, they should be clearly marked at a height ranging from 90 to 160 cm. All doors should have an accessible door handle. There should also be a sign indicating the door opening direction (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Foldable inclined wheelchair lift should have a tread measuring at least 90 × 100 cm. The curved safety arms should be set at a height of 20 cm and there should be a folding handrail. An accessible foldable inclined wheelchair lift should be marked with the international symbol of accessibility (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Ground plan for orientation should be set horizontally, at a maximum height of 90 cm, or vertically, with its top edge at a maximum height of 180 cm. It should contain information in Braille. A tactile strip 40 cm wide, with grooves pointing in the direction of movement, should lead from the entrance to the ground plan. An accessible ground plan for orientation should be marked with the international symbol of accessibility (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Handrail should be 4 cm in diameter, shaped in such a way that it can be easily gripped, and placed at the heights of 60 and 90 cm. It should have curved-end extensions of 30 cm

beyond the tread of the ramp. A handrail on an exterior staircase should be made of a material resistant to temperature oscillations (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Kitchen should have a worktop that is at least 90 cm long. The cooktop and sink should be wall-mounted with a knee space of at least 50 cm. The top surface should be at a maximum height of 85 cm and the underside at a minimum of 70 cm. To ensure that they are within the active reach of a wheelchair user, the bottom edge of the suspended elements should be at a height of 120 cm, while the bottom elements should be designed in such a way that they can be pulled out (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Maneuvering space should include a clear space of at least 150 cm in diameter (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Notice boards should be placed so that their content is visible to persons in wheelchairs: their bottom edge should be at a height ranging from 120 to 160 cm (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Parking space for persons with disabilities should measure 370 x 500 cm for a single car and 590 x 500 cm for two cars, with access aisles between the parking spaces that should be 150 cm wide. Access routes leading from the parking space to the pavement should be secured with a curb cut or ramp with a maximum slope of 10%, which is at least 120 cm wide (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Ramp should have a minimum clear width of 120 cm in the exterior, and 90 cm in the interior. The maximum ramp slope should be 1:20 (5%). Exceptionally, for level differences up to and including 76 cm, the maximum slope may reach 1:12 (8.3%). At every 6 m along the ramp, a landing with a minimum length of 150 cm should be provided. The surface of the ramp should be slip-resistant. A handrail that is easy to grip should be placed at unprotected parts of the ramp. A glass panel railing should be clearly marked. An accessible ramp should be marked with the international symbol of accessibility (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Route of travel should be at least 120 cm wide, the ideal width being 150 cm (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Seats in changing rooms or locker rooms should be placed at a height ranging from 45 to 50 cm. If there are clothes hangers above the seats, they should be placed at a height of 120 cm (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Shower area is the more frequently chosen option than the bathtub. Its minimum dimensions should be 90 x 90 cm; it should have a grab bar set at a height of 75 cm and no shower screen. The shower area should have a waterproof folding seat fitted at a height of 45 to 50 cm. The soap holder should be fitted at a height of 90 cm (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Staircase should have stairs with a maximum height of 15 cm and treads that are at least 33 cm wide. The minimum clear width of a flight of stairs should be 110 cm in the interior and 120 cm in the exterior. The edge of the tread should be marked with a strip which should be at least 2 cm wide, slip-resistant and in color contrast with the tread. A flight of stairs wider than 250 cm should have a handrail in the middle. The space below the first flight of stairs should be secured with a railing 70 cm high, which should extend to the point where the underside of the flight of stairs is 210 cm high. Otherwise, the space should be secured by raising the floor level by 3 cm up to the point where the underside of the flight of stairs is 210 cm high. A glass panel railing should be clearly marked. A tactile warning surface, at least 40 cm wide, should be placed before the first and after the last stair, covering the entire width of the flight of stairs. The grooves of the tactile warning surface should be placed vertically in relation to the direction of movement. An accessible staircase should be marked with the international symbol of accessibility (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Table should be wall-mounted, with its top surface at a maximum height of 85 cm and its underside at a minimum height of 70 cm. The minimum knee space provided should be 50 cm (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Teller window should be wall-mounted, with its top surface at a maximum height of 85 cm. There should be a communication aid installed. An accessible teller window should be marked with the international symbol of accessibility (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Threshold should not be more than 2 cm high, to enable independent movement of wheelchair users (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Toilet bowl for persons with disabilities should be from 45 to 50 cm high (including the toilet seat) and the distance from the front part of the rim to the wall should be at least 65 cm. There should be two grab bars next to the toilet bowl, 90 cm long and attached to the wall at a height ranging from 80 to 90 cm. The flush button should be placed at a height of 70 cm, or the toilet flushing system should be automatic. In front of the toilet bowl, there should be a clear floor space at least 90 cm wide (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Vertical wheelchair lift should have a tread measuring at least 110 × 140 cm. The lateral sides of the lift should be closed up to the height of 120 cm. The entrance door should be a sliding door or a swing door which opens outwards, and it should have a clear opening width of 90 cm. An accessible vertical wheelchair lift should be marked with the international symbol of accessibility (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Washbasin should be at least 50 cm wide and fitted at a height of 80 cm. It should be wall-mounted, with a siphon built into the wall or fitted right next to it. It should have a single lever mixer tap or an automatic (sensor) tap. In front of the washbasin, there should be a clear floor space at least 90 cm wide. For security reasons, an alarm with a switch or a pull string should be installed in the toilet, at a height of 60 cm (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Wheelchair space in an auditorium, accessible to persons with disabilities, should have the layout dimensions of at least 90 x 140 cm, and it should be marked with the international

symbol of accessibility (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

Window should have accessible and appropriately shaped handles. The opening mechanism should be easy to use and placed at a height ranging from 90 to 120 cm (Ordinance Ensuring Access to Buildings for Persons with Disabilities and Reduced Mobility, OG, 151/05).

10. References

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