

# Universal Design and Sustainable Spatial Development

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**Abstract.** The article focuses on document research at the international level in the field of universal design, comparing the situation in Europe, the USA, and Latvia. Research summarizes the results and makes proposals for improvement of the situation in Latvia. Considering the problem, it has been concluded that universal design can be considered a tool of social policy that will allow anyone to incorporate himself in any environment.

**Keywords:** universal design, historical development, sustainable spatial development, environment accessibility.

## I. INTRODUCTION

This article outlines the historical development of universal design, focusing special attention on the situation in the USA and Europe. The USA can be considered the birthplace of universal design, but the situation in Europe influences developments in Latvia as a member state of the European Union.

This article summarizes information, analyzes and evaluates it, as well as explores a variety of laws, regulations, forming a single material, which gives focused information about the development of universal design.

The main problem related to universal design in Latvia is social, including young professionals – students, professional architects, designers, who have incomplete knowledge about universal design and its principles. There is relatively little information about universal design and environment accessibility available in the Internet articles and books, but most of them are published abroad and are not available in Latvia. The information presented in the article will serve as informative material for the emergence and development of universal design.

## II. UNIVERSAL DESIGN

Universal design is defined as follows:

Universal design is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. [4] Universal design understands in the same sense as "integral accessibility", "design for all" and "all-round" design. Universal design is an approach to create an environment that is accessible, understandable and applicable to all people irrespective of age, body size, abilities and other physical qualities. It is mistakenly considered that universal design is only for people with disabilities. This design includes disabled people's needs, but speaks about all public society interactivity with the environment. Universal design can be considered a tool of social politics that will allow anyone to adapt in any environment.

Universal design is an approach to design that works to ensure that products and buildings can be used by virtually

everyone, regardless of their level of ability or disability. Successful universal design describes its invisibility, for example, ramps or right elevator size. Universal design is an "early project", not an idea that has arisen after the project implementation, followed by environmental adaptation [2].



Fig. 1. Roland Lawrence Mace (1941–1998) [2]

Ron Mace (Fig. 1), creator of the term "universal design," was an architect and a determined lawyer, who influenced international thinking about design. The definition was used by the Centre for Universal Design at North Carolina State University.

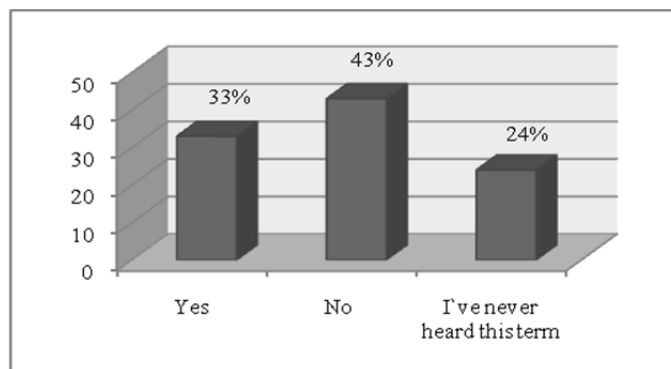


Fig. 2. Knowledge of the term "universal design" in the Latvian society [12].

Universal design seeks to encourage attractive, marketable products that are commonly used by everyone. It is design for the built environment and consumer products for a very broad definition of user [4].

The Latvians do not have enough information about the universal design. This fact was proved in the social inquiry, where 43% of respondents did not know the meaning of the term "universal design", but 24% had never heard of this term at all (Fig. 2). Only 33% of respondents knew the meaning of this term and explained it, for example, as follows: accessible environment, services, information and products for all people

or design for all people and anywhere. The promotion of information access will help educate the Latvian society.

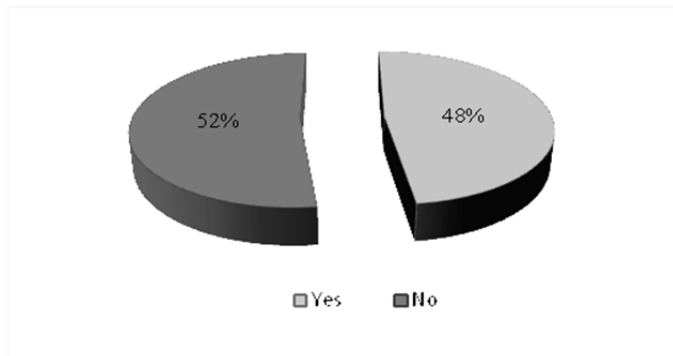


Fig. 3. Latvian people wish to obtain more information about the universal design and barrier-free environment [12]

Fig. 3 shows that more than a half of respondents would like to obtain information about the universal design and accessibility. For this reason, it is necessary to make materials in a variety of formats— brochure, electronic, conference or lecture form. The main languages for the information dissemination are Latvian and Russian.

### III UNIVERSAL DESIGN DEVELOPMENT IN THE USA

The universal design as a dimension, which takes part in the creation of an environment, has been discussed in Latvia recently, but also all over the world it has become an important issue and a defined concept only at the end of the 20th century. Although the concept is new, it has its own history, its own development and it is worth examining how much people do nowadays to achieve a situation of accessibility and universal design.

Universal design appeared in the middle of the 20th century in America: “barrier-free movement” was the first and important step in terms of universal design for people with disabilities. The “barrier-free movement” in the 1950s began a process of change in public policies and design practices [6]. The movement was established in response to demands by veterans with disabilities and advocates for people with disabilities to create opportunities in education and employment rather than institutionalized health care and maintenance.

The Disability Rights Movement started in the late 1960s shortly after the Civil Rights movement [6]. This movement was unique because it was pluralistic – movement brought together people with no health problems, as well as people with various disabilities. They endeavored to reach specific goals. The specific goals and demands of the movement are: accessibility and safety in transportation, architecture, and the physical environment, equal opportunities in independent living, employment, education, and housing, and freedom from abuse, neglect, and violations of patients' rights [7].

“Barrier-free movement” activities attracted the society attention, for that reason in 1961 the American Standards Association (later known as the American National Standards Institute, or ANSI) published the first accessibility standard titled “A 117.1 - Making Buildings Accessible to and Usable by the

Physically Handicapped” [6]. The standard adopted by America, not only made a major benefit to Americans, but also other countries' inhabitants. A number of states responded with their own accessibility standards, and by 1966, 30 states had passed accessibility legislation; by 1973, the number was up to 49 states [8].

This standard has been corrected over the years, developed, screened, providing an active process of improving the environment and, therefore, the quality of life of all members of society.

The Architectural Barriers Act of 1968 mandated the removal of what was perceived to be the most significant obstacle to employment for people with disabilities: the physical design of the buildings and facilities they had to use while on the job [6]. The Act required all buildings designed, constructed, altered, or leased with federal funds to be accessible [8].

Section 504 of the Rehabilitation Act of 1973 was the first civil rights law for people with disabilities [6]. This Act made it illegal to discriminate on the basis of disability and applied to federal agencies, public universities, federal contractors, and any other institution or activity receiving federal funds. The promulgation of regulations was initially stalled by the U.S. Department of Health, Education and Welfare. In protest, disability rights advocates held numerous demonstrations. As a result, regulations were finally issued in 1977.

Starting from the first idea about environment arrangement and people's welfare, the term “universal design” was not used but, for example, accessibility, environment free of obstacles, barriers (barrier free). The term “universal design” appeared only in 1985, and its creator was the architect Ron Mace, who was a member of the American Institute of Architecture [1]. Ron Mace was a man with physical disabilities, who everyday came into contact with different problems, which did not enable all people to feel equal, so on the basis of experience the architect all his life worked on the issues of environmental accessibility and universal design.

In 1988, President Reagan signed into law the Technology-Related Assistance for Individuals with Disabilities Act. This act is also known as “The Tech Act.” The Tech Act provided funding to states to develop technology-related educational assistance for students of all ages, with all types of disabilities [6].

The essential role of environmental accessibility in America was played by the Centre for Universal Design (CUD). The Center for Universal Design has been working since 1989 on accessible design for environments and products. CUD is national information, technical assistance, and research center that evaluates, develops, and promotes accessible and universal design in housing, commercial and public facilities, outdoor environments, and products [1].

The Americans with Disabilities Act (ADA) was accepted in 1990 and triggered widespread public awareness of the civil rights of people with disabilities [6]. It gave citizens with disabilities equal rights and prohibited discrimination by the local and federal government, employers, and private services based on disabilities. The Americans with Disabilities Act provided the basic environment in the country to access [8].

On the basis of the law "Americans with Disabilities Act" in 1997 the law was established that talks about children with special needs and their rights to education. The Individuals with Disabilities Education Act (IDEA) is a law ensuring services to children with disabilities throughout the nation [10].

Law of the Americans with Disabilities Act was one of the most important milestones of the safe environment and conditions of reinstatement, but that does not mean that America ceased to improve the environment, and thus the public well-being. Until 1990 all laws were related to federal organizations obtaining state financing, but in 2004 all accessibility guidelines provided full access to public and private programs and facilities. In 2008 based on the Americans with Disabilities Act the first standard was created– 2008 ANSI Standard (ICC/ANSI A117.1) available in early 2009 [8].

#### IV. UNIVERSAL DESIGN IN EUROPE

In Europe, the term "universal design" and environment problem solving for people with disabilities came from the United States. "Americans with Disabilities Act" was taken for a base informational document for many countries, when they created their own guidelines for laws to protect people with disabilities and create an accessible environment. In Europe, active measures for environment arrangement and universal design were taken in the end of the 20 century or 20 years ago. This process is in progress nowadays, but it is necessary that all members of the society invest a lot of work in any environment to feel safe and comfortable.

An important role in Europe is taken by the organization "European Institute for Design and Disability (EIDD)", founded in 1993, with the aim of promoting better building design for people with disabilities. The basic idea of the Institute is to improve their lives through design. EIDD is the main organization and under EIDD there are many national organizations located in different European countries – Denmark, Finland, Norway, Sweden, Ireland, Great Britain, Spain, Portugal, Italy, Belgium and the Netherlands [5].

##### *Greece– European Country, Which Relatively Early Started to Solve the Environmental Accessibility Problems*

In 1985, through the intervention of the Panhellenic Association of Paraplegics, a Research Office for People with Disabilities was created as part of the Minister's Private Office of the Ministry for the Environment, Physical Planning and Public Works. Since that time the Ministry of the Environment has created guidelines to promote general accessibility to the built environment: streets, pedestrian areas, public buildings, housing and all forms of transport. The purpose of these guidelines has been to promote practices which take into account the needs of all persons – both disabled and those who are impeded or hindered in their everyday mobility, such as children, older people, and persons pushing prams or with trolleys or heavy objects, etc. The Guidelines, entitled "Designing for All" were revised in 1998 and contain 10 chapters of planning recommendations covering almost the whole spectrum of accessibility to buildings, private houses, outdoor spaces, etc. Additional guidelines have been recently

revised addressing the design of cinemas, theatres, tourist facilities, hotels, cultural and athletic venues, etc. These are not yet included in the latest published version of the Guidelines. With the preparations for the Olympic and Paralympic Games to be held in Athens and other major cities in 2004, the implementation of the guidelines was taken up in earnest, and the general level of accessibility was improving more rapidly than at any other previous time.

A very important document about the universal design in Europe was discussed in 2000 in Tomar (Portugal). After the discussion it was presented to the Committee of Ministers, which approved it on February 15, 2001. The document is entitled "Resolution ResAP (2001) 1 on the Design and Universal Design Principles in All Environmental Building Practices and Training Programs" ("Tomar Resolution"). This resolution protects the rights of all individuals, including persons with disabilities, to participate fully in community life, including the right of access to and understanding of all the constructions of video creators. Resolution is defined by public accountability and responsibility, particularly in relation to the environment for areas of specialization, to create an environment generally available to all, including persons with disabilities [2].

"Tomar Resolution" is not only a document which establishes various principles related to the environment. Essential issues in this area are covered by the European Social Charter, for example, the right of people with disabilities to independence, social integration and participation in society, particularly through measures to overcome barriers to communication and mobility and provide access to transport, housing, cultural activities and leisure time ( Article 15(3.a)). The following documents protect the rights of people with disabilities: Recommendation No.(86) 18 "The European Charter on Sport for All: Disabled Persons"; Recommendation No.(92) 6 on a coherent policy for people with disabilities, the Parliamentary Assembly Recommendation No. 1185 (1992) "Rehabilitation of Persons with Disabilities", Policy and the United Nations Standard Rules on the Equalization of Opportunities for People with Disabilities, and the Barcelona Declaration "The City and the Disabled", signed by 150 cities in 1995. Also, there are many other documents that cover the problems of people with disabilities [2].

##### *"Barrier-Free Design" in Germany*

"Barrier-free design" has become a topical issue in Germany since 1994. This idea is not positioned just for people with disabilities, but also the elderly who need special housing design that would fit their needs and abilities. "Barrier-free design" includes not only housing but also product design [5].

##### *The United Kingdom and North Ireland in Relation to "Americans with Disabilities Act"*

Like Australia, the UK has passed an act on anti-discrimination "Disability Discrimination Act" of 1995, and has thereby created a basis for the necessary development of the field of universal design at the schools of design and architecture. "Disability Discrimination Act" is based on the "Americans with Disabilities Act" [7].

The law defines the equal rights of citizens to transport, employment and education, as well as provided goods and services, which provide people with disabilities. Britain expressed its support to this Act and the Equality and Human Rights Commission. Equivalent law "Disability Discrimination Act" is also in Northern Ireland. This law introduced the Equality Commission for Northern Ireland [7].

#### Universal Design in Norway

In Norway, the concept of universal design first appeared in 1997; Norwegian State Council on Disability issued Brochure "Universal design. Planning and Design for All" [4].

#### Environmental Accessibility in Latvia

Accessibility in Latvia is not much researched from the social point of view, but it has been defined by various laws, documents, but not always regulated desires are fully accomplished. 74% of respondents admitted that they come into contact with environmental problems of accessibility in the surrounding area. One of the largest problems is public transport in Latvia. It is not suitable for disabled people, mothers with prams, elder people. Significant problem mentioned by respondents is related to the public building architectural and planning problems, such as lack of ramps, lack of glass door marking, heavy or too narrow entrance doors and other problems. Respondents noted problems with public toilet planning in Latvia. There is too less space for comfortable feeling in public toilets. People of different body size, with equipment such as wheelchairs not always feel well there and can use these facilities.

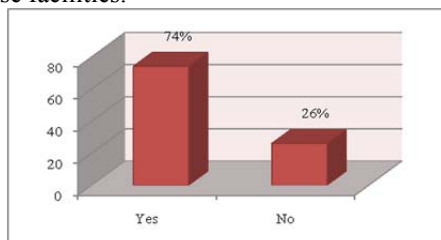


Fig.4. Situation in environment accessibility in Latvia [12]

The term "universal design" is relatively new in Latvia; it is better to discuss the availability of environmental regulation based on the established normative documents. The Ministry of Economics of the Republic of Latvia passes the laws and regulations, which apply to people with disabilities. These documents are Latvian Building Standard LBN 208-00 "Public Constructions and Buildings" (in force since 2001), Latvian Building Standard LBN 211-98 "Multi-Storied Apartment Buildings" (in force since 1999). One very important rule of environmental accessibility is the Latvian Building Law (in force since 1995). The above-mentioned laws and codes are guidelines for designers and planners, which must be followed, but as we know in practice everything is not always completely satisfactory [9].

Besides the Latvian Building Law and other documents, there are also international legal documents on human rights (in force since 1990). Important disability politics document is the concept of "Equal Opportunities for All" (2010). This concept

establishes guidelines for creating equal opportunities for all members of society [9].

The questionnaire included questions on the laws and the respondents' knowledge of them. (Fig.5). 64% of respondents were not aware of any documents available to determine the environmental building requirements. Only 9% of respondents knew some laws and documents. The most popular answers were LBN "Public Buildings and Structures", "Building Law", European Union directives, ISSO standards. 20% of respondents knew only a few laws. The most popular answer was "Building Law".

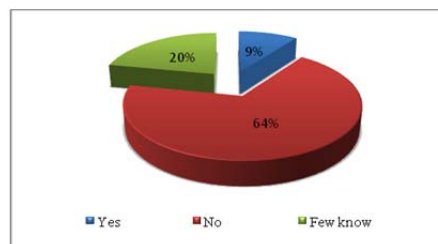


Fig.5. People's knowledge of laws and regulations for accessibility in Latvia [12]

For an ideal situation in accessibility there is still a long way to go in Latvia, but each educational activity, which is made for the society, professionals, students, is a step closer to perfection of Latvia.

The world population is living longer as medical advances contribute to declining death rates. The growth of the 50+ age group has escalated and more wealth is being passed from generation to generation helping to promote better products and services for the "good life". Serendipitously, as much as things change, much remains the same. Values, beliefs and traditions are enriched over time. The dignity of the human spirit resonates loud and clear, generation-to-generation. The quality of a person's life and the lives of those they care about will always hold the highest significance for them.

Change is the essence of life and can have a tremendous impact on one's sense of well-being. Our personal worlds deliver the things needed to keep our batteries charged and we are often able to affect the degree of change there. We can take control of our environment and enhance our lives, as well as the lives of those who are the most important people for us by becoming aware of some basic design principles. Genetics, environment and lifestyle affect our longevity and our quality of life. We are limited in not being able to change our genetics, but we can enhance what our DNA has predestined for us through a healthier lifestyle and a more accommodating environment. As a result, we can live longer, more enriched, lives. Wisdom comes through implementing knowledge to benefit outcome. Our changing cultural phenomena are requiring the world to use all of their acquired knowledge to reassess how we live, how we support our evolving life patterns and how we put into action what takes to "make it happen". The housing stock in the United States is built to accommodate the average twenty-five year old, six-foot tall male. If this profile does not match your individual vital statistics you can correctly conclude that the bulk of this housing was not built to best accommodate you. In fact, this model group is but a minute segment of the entire population.

## CONCLUSIONS

The article provides an important research on the universal design introduction to life in different countries around the world. Considering the topical problems, it can be concluded that the universal design can be considered a tool of social politics allowing everyone to adapt in any environment. Successful universal design can be described by its invisibility, such as ramp to the stairs or bigger entrance doors, because the universal design is an "early project", not an idea after the project implementation. Starting from the first idea on environmental arrangement and people's welfare, instead of the term "universal design" the following terms were used: "accessibility", "barriers (barrier free)", "environment free of obstacles". An essential role for environmental accessibility in America is played by the Centre for Universal Design, which was established in 1989 at the University of North Carolina. The centre conducts different types of research activities, offering information and technical support. The Centre develops and promotes accessibility and universal design in buildings, urban and global environment. To improve the situation in Latvia we need to use "sustainable progression principle". In the Latvian society only few people know the term "universal design" and "accessibility", but they are interested in this area. People are willing to know more about the universal design, its principles, laws and regulations. The most significant problems are associated with public transport, public buildings and public facilities.

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**Andra Ulme. Universālais dizains un ilgtspējīga telpiskā attīstība**

„Universālais dizains” ir tādu produktu un vides radīšana, kas, cik lielā mērā vien iespējams, būtu pieejami lietošanā ikvienam, bez nepieciešamības veikt adaptāciju vai radīt speciālu dizainu”. Universālo dizainu nemāca nevienā Eiropas universitātē, nedz arī arhitektūras skolās, inženierzinātnē un projektēšanā; to neapraktizē arī daudzi Eiropas arhitekti, inženieri, projektētāji vai pilsētu plānotāji. Tādējādi raksta mērķis ir nodrošināt, lai universālā dizaina principi tiktu iestrādāti visās vides veidošanas specialitāšu izglītības un apmācību programmās, informēt sabiedrību par universāla dizaina principu integrēšanu telpiskās plānošanas stratēģijā, principu saskaņotību ar ilgtspējīgas attīstības principiem.

Raksta tapšanā izmantotas kvalitatīvās un kvantitatīvās pētījumu metodes, kā arī grafoanalītiskās, lai attēlotu pētījuma rezultātus. Aplūkoti zinātnisko pētniecības centru veiktie starptautiskie pētījumi, kā arī autoru veiktās aptaujas Latvijā 2011. gada sākumā, apkopoti rezultāti un izteikti priekšlikumi situācijas pilnveidošanai Latvijā.

Rakstā liela uzmanība pievērsta dokumentu izpētei starptautiskā mērogā, salīdzinot situāciju Eiropā un ASV, apskatot vēsturiskos universālā dizaina attīstības posmus, kā arī konfrontējot tos ar situāciju Latvijā. ASV tāpēc, ka šo valsti var uzskatīt par universālā dizaina rašanās un definēšanas vietu, bet Eiropā notiekošais tiešā mērā ietekmē arī notikumus Latvijas, kā Eiropas Savienības dalībvalstī. Kā galveno problēmu Latvijā saistībā ar universālo dizainu var minēt sabiedrības, tajā skaitā arī jauno speciālistu – studentu, un arī profesionālu arhitektu, projektētāju nepilnīgās zināšanas universālā dizaina jomā, tā principos. Būtiskākās problēmas saistās ar sabiedrisko transportu, publiskajām ēkām un sabiedriskajām labierīcībām. Rakstā tiek sniegti priekšlikumi situācijas uzlabošanai Latvijā, ievērtējot Latvijas ilgtspējīgas attīstības dokumentos minētos principus.

Apskatot problēmu, tiek secināts, ka universālo dizainu iespējams uzskatīt kā līdzekli sociālajā politikā, kas ļautu ikvienam iekļauties jebkurā vidē.

Universālā dizaina jēdziens ietver telpisko plānošanu, arhitektūras un transportēšanas risinājumus, kā arī dažādu iekārtu konstrukciju uzlabošanu, lai nodrošinātu komfortablus dzīves apstākļus visām iedzīvotāju grupām neatkarīgi no vecuma vai fiziskajām spējām. Sākotnēji nodrošinot pieejamu vidi, tika uzskatīts, ka nepieciešams risinājums sociālās integrācijas cilvēkiem ar invaliditāti. Tomēr vēlāk attiecībā uz visiem projektiem ir guvis atzinību šis, kā plašs jēdziens, jo īpaši svarīgi, - saistībā ar demogrāfiskajām izmaiņām, kas raksturīgas daudzām valstīm, - dzīves ilguma pieauguma rādītāji un gados veco cilvēku īpatsvars sabiedrībā.



**Андрэ Улме. Универсальный дизайн как инструмент устойчивого пространственного развития**

Универсальный дизайн – это дизайн продуктов и объектов, которые могут в полной мере использоваться всеми людьми без необходимости специальной адаптации или специального дизайна. Универсальному дизайну не учат ни в одном из университетов, ни в школе архитектуры, проектирования и дизайна, его не практикуют большое число европейских архитекторов, инженеров, дизайнеров и градостроителей.

Таким образом, цель статьи направлена на обеспечение внедрения принципов универсального дизайна в программы образования специалистов, создающих окружающую среду, на информирование общественности об интеграции принципов универсального дизайна в стратегии пространственного планирования, на согласованность этих принципов с принципами устойчивого развития.

В статье использованы качественные, количественные и графические методы исследования. Рассмотрены международные исследования научно-исследовательских центров, обобщены результаты и внесены предложения по улучшению ситуации в Латвии. Статья уделяет внимание исследованиям документов международного уровня, сравнивая ситуацию в Европе и США, рассматривая исторические фазы развития универсального дизайна, и сравнивая их с ситуацией в Латвии.

Главная проблема универсального дизайна в Латвии – недостаточные знания вопроса в обществе и среди специалистов. Наиболее серьезные проблемы связаны с общественным транспортом, общественными зданиями и объектами общественного пользования. Даны предложения для улучшения ситуации в Латвии учитывая принципы изложенные в Латвийских документа устойчивого развития.

Глядя на проблемы, делается вывод, что универсальный дизайн можно рассматривать как инструмент социальной политики, который позволил бы любому человеку влиться в любую среду. Концепция универсального дизайна включает в себя пространственное планирование, архитектурные и транспортные решения, а также дизайн различного рода объектов с целью обеспечения комфортной жизнедеятельности всех категорий граждан, независимо от возраста или физических возможностей. Отсутствие физических барьеров, максимальное удобство и простота в использовании – вот что отличает объекты, созданные по принципам дизайна для всех.

Первоначально обеспечение доступной среды считалось необходимым решением для социальной интеграции людей с ограниченными возможностями. Впоследствии, однако, дизайн для всех стал более широким понятием, особенно важным в связи с демографическими изменениями, характерными для многих стран - увеличением продолжительности жизни и процента пожилых людей в структуре общества.