Universal Access and Universal Design – state of the art and as seen by future design and construction professionals in Greece

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Abstract: Over the last couple of decades, Universal Access and Universal Design have started to become an inseparable aspect in every design and construction project. Unfortunately, this still is not reality if a glance at education of relevant future professionals is taken. In order to reveal the existing situation in planning schools, a survey was carried out in Greece in autumn 2008 in order to interrogate the level of knowledge and understanding of students of design and construction professions as regards matters of accessibility. This paper presents this survey's results and discusses its outcome. In the end some conclusions are drawn and future perspectives are portrayed.

Key-Words: universal design, accessibility, education, future design professionals, survey, Greece

If not otherwise mentioned, all data in this paper originates from the author's dissertation thesis [1]; all information on the survey and relevant tables derive from the co-author's master thesis [2].

1 Introduction

It is undoubted, almost trite, that social behaviors, attitudes, believes and contradictions are reflected in space. Graduations in the organization of space establish diversifications of social perceptions regarding the integration and incorporation of people with disability and people with reduced mobility as persons with full rights and duties in social life. Thus, accessibility is a matter of the interdependence of combining barrier-free forms of housing, neighborhood and urban space.

The necessary precondition for autonomous mobility and ameliorated living conditions for everybody is the creation of save, accessible and friendly spaces without barriers or exclusions. Such environments allow all citizens to live, to move and to use in a comfortable, independent and secure way their homes, working places, recreation areas, shops, all open-air spaces, means of transport and so on.

In conclusion, universal access and the functioning of the chain of accessibility are of major importance, as they form the crucial basis for the elimination of architectural barriers in the built environment. Over the last decades, reformations of design guidelines and norms have taken place and Universal Design criteria have been integrated into many countries' national building regulations. However, their correct integration and implementation in every new architectural project remains questionable, as today's understanding of accessible environments is far from being the ordinary, as shortly presented in the following.

2 Organization of urban space

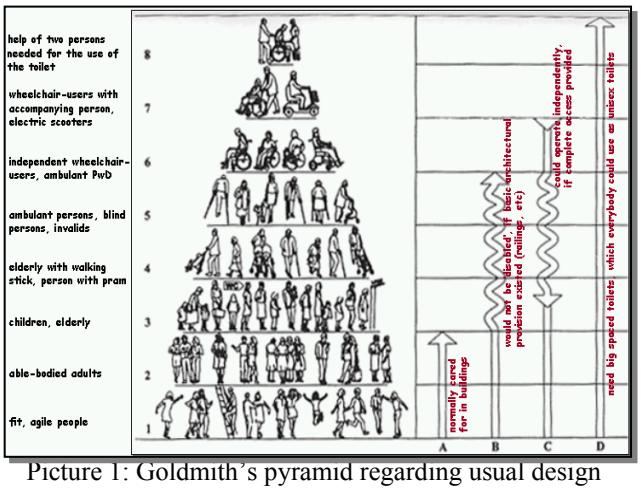
The organization of urban space can either restrict or tighten the degree of a person's physical disability, either limit or widen the degree of physical dependence. If a Person with disability is situated in a surrounding, which has been designed in such a way, that her/his autonomy is supported, she/he will not extrovert her/his impairment as a total restraining factor for the development and evaluation of her/his personality.

If a glance back at modern after-industrialised societies is taken, it becomes clear, that less and less interest in different needs of various population groups, especially those of persons with disability or persons with reduced mobility was taken. However, until today, the emergency of avoiding exclusion of numerous groups of the population constitutes an urgent necessity aiming at redesigning and

reorganising urban areas [3].

The spatial structure of urban spaces still propagates all dominant power relations, as design continues to be oriented towards over-resistant individuals and super-humans with ideal physical attributes that few humans can ever hope to approximate. In conclusion, it is not only persons with reduced mobility and persons with disability, which are oppressed and dominated by values and practices that (re-) produce their marginal status of being locked away. The exclusion from the general use of urban infrastructure (buildings, public services, means of transport, etc.) of at least every 1 out of 4 (1:4) citizens is alarming

S. Goldsmith [4] has pointed out the actual situation in his eight-level design pyramid (see pic. 1), focusing on the use of public buildings and public toilets.



Picture 1: Goldmith's pyramid regarding usual design considerations linked to public buildings' user goups

Row 1 deals with fit and mostly agile people, who can run, jump, leap up stairs, climb perpendicular ladders, dance and carry loads of heavy baggage. Row 2 represents the generality of normal adult able-bodied people, who, while not being athletic, can walk wherever needs or wishes may take them, with flights of stairs not troubling them. These two rows are marked with pointer A, which means that architects do normally care well enough for these people.

Row 3 shows normal able-bodied people, whose needs normally are not considered by architects. This row includes people with children and elderly persons. Row 4 portrays elderly persons, who use walking sticks to move around, but probably do not consider themselves as being 'disabled', as well as people with infants in prams. In row 5 ambulant people are listed, like injured persons, persons with crutches and blind persons lead by guide-dogs. These three rows consist of persons, who normally would not be 'disabled', if architecture would offer basic dimensions and equipment suitable for them (pointer B). If public toilets were planned more accommodating and conveniently reachable and steps and stairs were more comfortably graded and equipped with handrails, these persons would face little problems in public buildings, if at all.

Row 6 deals with independent wheelchair users or ambulant people with disability, who do not necessarily need help when using public toilets. Pointer C is drawn top-down, underlining the fact, that if access provision is taken in and around buildings, these people can operate independently.

Finally, row 7 shows people with physical impairments, like wheelchair users, who need another person to help them and those people with disability, who drive electric scooters. Row 8 portrays wheelchair users, who need the assistance of two persons to use public toilets. Pointer D stresses, that these two rows need e.g. toilets for wheelchair users and if they are planned as unisex family toilet facilities, where a second person can enter to help, it has not to be considered as something 'special', rather than a Universal Design facilitation for all rows.

3 Today's understanding of accessible environments

Designing for people with reduced mobility and people with disability is designing for every citizen. However, a significant problem observed in many reformatting theories is an underlying reductionism, where access policies tend to reflect societal stereotypes. Often people with disability are presented as members of a homogenous group having solely mobility impairments and in conclusion, all their interests and requirements being the same.

Equality regards citizens who have similar necessities and possibilities. Also evident biological and physical changes, which occur to everyone during lifetime, have been mostly ignored in the design and organisation of urban space world-wide in the last years. It is still aspects of medicalisation (rehabilitation) and functional limitations that retain power over elements of public policies towards disability. Unfortunately, often the doubtful assumption is expressed, that "because built environment facilitates access for most people, it should be possible for disabled people to adapt their behaviour to the environmental constraints that they encounter" [5: 28].

"For Person with disability everything is placed

on the top of a hill. Difficult climbing is required, but once having reached the top, the view and the satisfaction are magnificent. Nevertheless, it is our duty to make this hill become a flat country" [6: 112]. New social perceptions regard all members of society as potential persons with reduced mobility. Thus, space has to be designed, organised and maintained in such ways, that adaptation and use is possible for everyone.

"The phrase 'accessible to all disabled people' is very hard to pin down and does not simply mean step-free access" [7: 26]. But focusing on wheel-chair access only, important as it is, will not solve simultaneously all other accessibility problems.

4 The power role of design and construction professionals

During the last decades, powerful critique on the role of architects, civil engineers, constructors, etc. has emerged. This criticism is mainly based on the over-all dominance of gendered and racial divisions in space. Although people and places are fluid, transformative and multi-dimensional, architecture seems to continue to petrify social forms and to deny and to resist to the dynamic of society. [8]

Persons with reduced mobility and people with mobility impairments are most vulnerable to architectural discrimination (see pic. 2). This has not only to be related to steps and stairs or confined turning spaces, but also to fixtures and controls that are too high or too low to reach. However, it is these persons, who could mostly benefit from Universal Design implementations. [9]

Picture 2: no comment!!!

Such deficits and disrespectfulness can be clearly related to the lack of social questioning on the part of design professionals. The already discussed prototypes survive in an excellent way, regardless all existing norms and regulations for Universal Design. It is design and construction professionals that have to finally become aware of the discriminating environments they are continuously creating. Architectural solutions have to start to be founded on detailed elements serving the use for everyone within the population. Isn't it architecture that guides most of all and develops communication, understanding, co-habitation, respect, etc.?

The all-over understanding at least from the point of view of design professionals has to be to make space and buildings accessible. This means to provide and guarantee access without barriers or hindrances and usable for everyone without any help, irrespective of age or impairment. [5]

Only if ethic and open-mindedness is treated during the education and formation process of design and construction professionals, future degree holders will think of Universal Design and Universal Access as of something seld-evident, when practicing their profession.

If this aim is achieved, persons will not have to find different ways to adapt space or to enter buildings and they will feel accepted and in conclusion more comfortable and safe when moving around!

5 Future design and construction professionals' education

However, design reality is far from engaging in the subjective being and human diversity. Apart from the planner's judgment, also planning schools are to blame that spaces continue to propagate exclusion. Furthermore, it is governing and regulatory bodies, which do not seriously take the responsibility to control and conduct building procedures.

As already mentioned, the proportion of the population of people with disability grows in these days. But the design profession has not kept pace with these changes of society. Environmental implications of the increasingly ageing and/or disabled population have been mostly disregarded so far.

Already one and a half decades ago, in 1993, on December 20th, the United Nations signed resolution 48/96, which remarks in rule 5 (accessibility) the importance of informing and educating design and construction professionals as regards Universal Design and Universal Access regulations as follows [10]:

"1. Such measures should be to develop standards and guidelines and to consider enacting legislation to ensure accessibility to various areas in

society, such as housing, buildings, public transport services and other means of transportation, streets and other outdoor environments.

2. States should ensure that architects, construction engineers and others who are professionally involved in the design, construction and renovation of the physical environment have access to adequate information on disability policy and measures to achieve accessibility.

3. Accessibility requirements should be included in the design and construction of the physical environment from the beginning of the designing process."

In 2001, on February 15th, the Committee of Ministers of the Council of Europe adopted at the 742nd meeting of the Ministers Deputies 'Resolution ResAP (2001)1 on the principles of universal design into the curricula of all occupations working on the built environment', which emphasizes the almost total lack of compulsory training programs with a universal design dimension for all occupations working on the built environment [11]:

"It is the responsibility and duty of society and in particular of all occupations working on the built environment, to make it universally accessible to everyone, including persons with disabilities. (…) Such policy includes the education and training of key players in this process. Through a co-ordinated set of measures introducing the concept of universal design into the curricula of all occupations working on the built environment, people of all ages, sizes and abilities should be enabled to have as much mobility and access to buildings, as well as means of transport, as possible, so that they can play a full role in society and take part in economic, social, cultural, leisure and recreational activities.

For the purpose of taking early action to promote a coherent policy to improve accessibility, the concept of UD should be an integral and compulsory part of the mainstream initial training of all occupations working on the built environment, at all levels and in all sectors. Adequate further training should be made available for active professionals, such as architects, engineers, designers and town planners. Their attendance should be strongly encouraged. (…) Curricula of architects, engineers, designers and town planners at under-graduate and post-graduate level should develop the following skills:

- that of perceiving the relationship between human beings and their contractual creations and between the latter and their environment,
- that of understanding the need to accord contractual creations and space in compliance with human needs,
- that of mastering problem-solving techniques in order to increase the usability of all their contractual creations, taking into account human diversity."

Despite of all attempts to introduce Universal Design-courses into the obligatory educative process of all occupations working on the built environment, at all levels and in all sectors, the fact is, that most planning schools still ignore relevant matters, although accessibility consultants are self-evident for big projects world-wide (see pic. 3).

Picture 3: Accessibility consultants are self-evident in big projects world-wide

Even in the few institutions, where the issue of barrier-free spaces and aspects of Universal Design are taught, the subject is treated like an 'issue' and like an after-thought or add-on in the design-procedure. Furthermore, no interaction and contact between students and people with disability in the community at large is observed. The matter is totally neglected so far.

Moreover, no compulsory attendance at continuing professional formation courses does exist. In conclusion, there is no guarantee, that architects, civil engineers, constructors, traffic engineers, travel organisers, etc., are informed, trained and up-dated on access and security issues. Reality shows, that it is mainly large-scale public buildings where serious concern on matters of accessibility are expressed and looked into, rather than housing projects.

In Greece, no relevant course is offered at any higher-degree educational institution for engineers or constructors, apart from periodically organized workshops or research courses. Thus, the authors engaged in a survey in autumn 2008 in order to investigate the degree of knowledge and understanding of future design professionals as regards matters of accessibility and Universal Design. The survey's results will be presented shortly in the following.

6 Authors' survey and its methodology

6.1 General remarks and sampling data

The survey was carried out with the aid of an anonymous questionnaire, which was distributed at the Departments of Architecture at the Technical University of Athens, of Civil Works' Engineers at the Higher Educational Institute of Piraeus and of Buildings' Renovation and Restoration at the Higher Educational Institute of Patras.

Ideally, students were supposed to fill out the questionnaire autonomously on their own. In total, 120 questionnaires were gathered, from which 38 derive from the Department of Architecture, 34 from the Department of Civil Works' Engineers and 48 from the Department of Buildings' Renovation and Restoration. Here, it has to be mentioned, that only 14,2% of the participating students did also work in a relevant office.

6.2 Survey's questionnaire

The survey's questionnaire tried to gain an overview on the way students deal with requirements of accessibility and relevant design issues, as well as on their social responsibilities. Therefore, some questions interrogated the students' opinion, while others tried to uncover their knowledge on existing guidelines and specific design criteria and dimensions.

6.2.1 Questions 1 to 4

Thus, questions 1 to 4 asked them to note specific Universal Access criteria regarding certain design issues. In detail:

- Question 1 asked them to write down three basic criteria in order to guarantee accessibility to a public building,
- Question 2 asked students to note three basic criteria when designing an accessible outdoor space,
- Question 3 asked them to write down three basic accessibility criteria when designing an accessible dwelling and
- Question 4 asked students to mention further Universal Design criteria when designing accessible spaces.

6.2.2 Questions 5 to 8

The following 4 questions asked the participating students to select the correct answer out of three possible ones regarding specific Universal Design issues. In detail:

- Question 5 asked them to choose the maximum permissible inclination of a pedestrian ramp out of the following three available answers: 5%, 7,5% and 10%,
- Question 6 asked students to choose the diameter of the wheelchair turning circle out of the following three available answers: 1,10m, 1,30m and 1,50m,
- Question 7 asked them to choose the proper height of manual control switches out of the following three available answers: 0,60-0,90m, 0,90-1,20m and 1,20-1,50m, and
- Question 8 asked students to choose the average percentage of supplementary costs if Universal Design criteria are applied correctly in a construction from the beginning out of the following three available answers: 0,2-0,3%, 1% and 5%.

6.2.3 Questions 9 and 10

Finally, the last two questions interrogated students' social responsibilities. In particular,

- Question 9 asked future design and construction professionals to express their opinion whether they thought, that by reducing architectural barriers a contribution to people with disability's social integration could be made and
- Question 10 asked them whether they thought, that by implementing Universal Design guidelines they would facilitate a building's use for everybody.

7 Future design and construction professionals' answers

7.1 Answers to Questions 1 to 4

The first three questions asked students to note for each question three basic criteria regarding accessibility in specific circumstances. Obviously, the variety of answers is large. Thus, in the following tables only a selection of the most commonly chosen answers is portrayed.

7.2 Answers to Question 1

In detail, Question 1 asked students to list three basic criteria when designing an accessible public building. Among all the answers which where given to this question there domain: "elevators" (23,1%), "ramps" (21,7%), "sanitary areas for people with disability (5,8%), "proper corridor widths" (5,3%), "special parking areas" (4,4%) and "accessibility" (3,1%) (see table 1).

	Frequency	Percent (%)
Elevators	83	23,1
Ramps	78	21,7
Sanitary areas for People with Disability	21	5,8
Proper corridor widths	19	5,3
Special parking areas	16	4,4
Accessibility	10	3,1
Out of total	*360*	*100,0*

Table 1: Answers to Question 1: Name three basic criteria when designing an accessible public building.

7.3 Answers to Question 2

Question 2 asked future design and construction professionals to note three basic criteria when designing an accessible outdoor space. Again, the variety of answers is big, but the answer "ramp" (24,4%) outstrikes all others, followed by: "tactile orientation marks" (7,8%), "pedestrian crossings-zebras" and "acoustic announcements at pedestrian crossings-traffic lights" with 3,9%, special parking areas (3,1%), sanitary areas for people with disability (2,8%) and proper pavement widths (2,5%) (see table 2).

	Frequency	Percent (%)
Ramps	88	24,4
Tactile orientation marks	28	7,8
Pedestrian crossings - zebras	14	3,9
Acoustic messages at traffic lights	14	3,9
Special parking areas	11	3,1
Sanitary areas for People with Disability	10	2,8
Proper pavement widths	9	2,5
Out of total	*360*	*100,0*

Table 2: Answers to Question 2: Name three basic criteria when designing an accessible outdoor space.

7.4 Answers to Question 3

The third question asked students to name three basic criteria when designing an accessible dwelling. The two most commonly chosen answers were "elevator" (18,6%) and "ramp" (15,0%), followed by criteria with less percentages such as: "properly sized sanitary areas" (3,9%), "parking areas for people with disability" (3,1%), "spacious areas with big openings" (2,8%), "ramp-staircase with banister that can transport a wheelchair" (2,5%), "proper dimensions of corridors" (2,2%) and "avoidance of height differences" (1,9%) (see table 3).

	Frequency	Percent (%)
Elevators	67	18,6
Ramps	54	15,0
Properly sized sanitary areas	14	3,9
Special parking areas	11	3,1
Proper height of manual controls	10	2,8
Spacious areas w/ big openings	10	2,8
Ramp-staircase w/ banister that can transport a wheelchair	9	2,5
Proper dimensions of corridors	8	2,2
Avoidance of height differences	7	1,9
Out of total	*360*	*100,0*

Table 3: Answers to Question 3: Name three basic criteria when designing an accessible dwelling.

7.5 Answers to Question 4

In the last question of this group students were asked to list any further criteria, which they considered important when designing an accessible building. The variety of answers is large again as can be seen in the following table (see table 4).

Answers to Question 4 include "properly sized sanitary areas" (3,1%), "fulfilling habitant's needs" (2,2%), "manual controls-switches-shelves in proper heights" (2,2%), "properly sized corridors" (1,7%), "special parking areas" (1,4%) and "accessibility" (1,1%).

	Frequency	Percent (%)
Properly sized sanitary areas	11	3,1
Fulfilling habitants' needs	8	2,2
Manual controls-switches-shelves in proper height	8	2,2
Properly sized corridors	6	1,7
Special parking areas	5	1,4
Accessibility	4	1,1
Out of total	*360*	*100,0*

Table 4: Answers to Question 4: Name three further criteria when designing an accessible space.

7.6 Answers to Question 5

Question 5 asked students to define the maximum permissible inclination of a pedestrian ramp and to choose the correct answer between 5%, 7% and 10%. As can be seen in the following figure (see fig. 1) only 39,2% chose the correct answer which is the 5%.

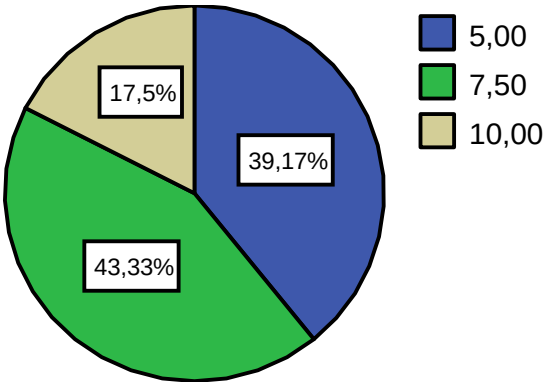


Figure 1: Answers to Question 5: What is the maximum permissible ramp inclination of a pedestrian ramp?

7.7 Answers to Question 6

The second question of this group asked future design and construction professionals to define the diameter of the wheelchair turning circle by choosing one of the following three possible answers: 1,10m, 1,30m and 1,50m. In total, only about 1 one out of 2 students (47,06%) knew the correct answer, which is the third one (see fig. 2).

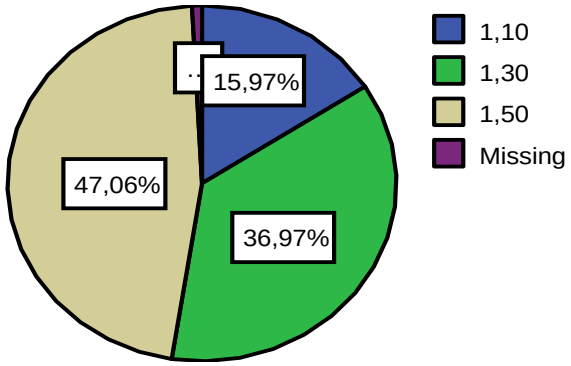


Figure 2: Answers to Question 6: What is the diameter of the wheelchair turning circle?

7.8 Answers to Question 7

Question 7 investigated students' knowledge on the proper height of manual control switches giving them the possibility to choose one out of the following three answers: 0,60-0,90m, 0,90-1,20m and 1,20-1,50m. As can be seen in figure 3, the correct answer, which is the second one, was chosen by more than half of all participants (60,8%) (see fig. 3).

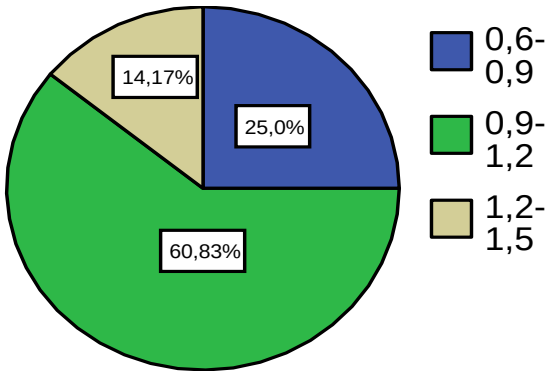


Figure 3: Answers to Question 7: What is the proper height of manual control switches?

7.9 Answers to Question 8

The final question of this group asked students to estimate the average percentage of supplementary costs if Universal Design criteria are applied on time in a construction. Quite astonishingly, 45,0% chose the correct answer, although the absence rate is the highest here (10%) (see fig. 4).

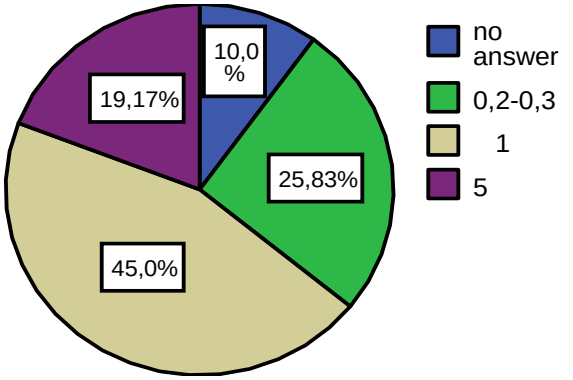


Figure 4: Answers to Question 8: What is the percentage of supplementary costs when Universal Design criteria are applied on time in a construction?

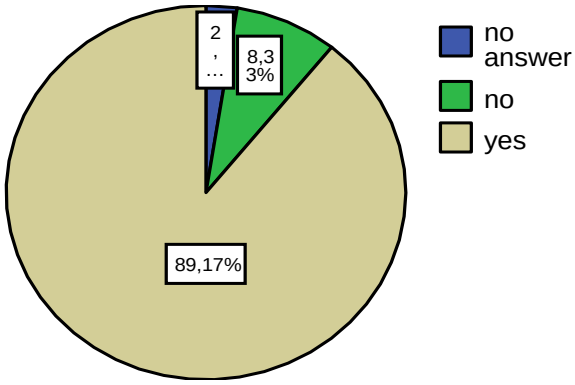


Figure 6: Answers to Question 10: Do you think that by following the Universal Design guidelines you will facilitate a building's use for everybody?

7.10 Answers to Questions 9 and 10

The results to these two final questions are quite satisfying. On the one hand, 79,2% of the students think that by reducing architectural barriers they can contribute in a positive way to social integration of people with disability.

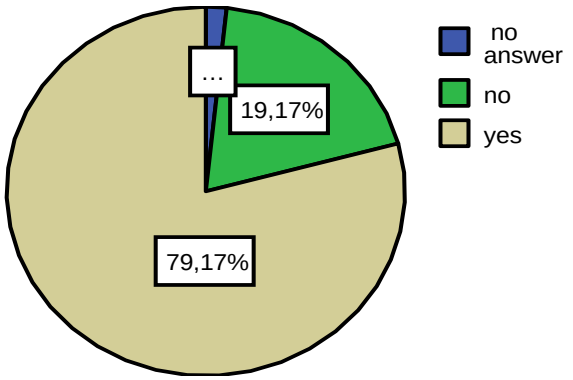


Figure 5: Answers to Question 9: Do you think that by reducing architectural barriers you can contribute to people with disability's integration ?

On the other hand, 89,2% of the participating students think that by following the Universal Design guidelines they will facilitate a building's use for everybody (see fig. 6).

8 Survey's outcome

Before analysing shortly this survey's outcome, it has to be pointed out, that although in many other European countries Universal Design has been integrated into the study plans as a separate issue since many years (either as a compulsory or a alternative semester lecture), in Greece, unfortunately, no intentions for integrating Universal Design lectures into the basic education program can be observed so far.

Although the teaching staff seems to be well informed on Universal Design and Universal Access guidelines, real implementations and good practice can only be found in private projects. The necessity to inform students and to transfer knowledge on accessibility matters to them does not seem to be of importance to the majority of Greek professors. Cooperative work for teacher training [12] on an international level could be used as an important input into this area.

No relevant course is offered at any higher-degree educational institution for engineers or constructors, apart from periodically organised workshops or research courses. As sad as it is, the only such course that is being held in Greece is at Athens' Medical School, where one professor sensitises future doctors on accessibility matters in his alternative course on 'Social pharmacology and Substantial Medicine'. This fact proves once more, that matters of Universal Design and Universal Access are clearly linked to the initiative and ethic of individuals.

In conclusion, students have no proper knowledge basis regarding matters of accessibility. From the precedent paragraphs it becomes clear, that future design professionals in Greece primarily think of wheelchair users and people with reduced mobility when referring to Universal Design. The preferred answers of "ramp-elevator-special parking lot" portray this short-mindedness, as other important attributes, such as "railings", "proper height of furnishing", "acoustic announcements", "proper height of obstacles", "obstacle-free paths", "proper surfaces", etc. were only mentioned in very rare cases if at all.

Besides that, important knowledge gaps regarding dimensioning were noticed. This of course needs to be related to the total absence of relevant lectures at higher degree educational institutions for future design and construction professionals. As the transmission of Universal Design guidelines solely lies in the hand of the teaching staff, it can easily be understood, that accessibility and proper dimensioning is an add-on if time and lecture conditions permit it.

However, it is encouraging, that future design professionals in Greece are beginning to become sensitised and this awareness-rising regarding the different needs of all population groups should of course become the prevailing idea in every project. In their future career, design and construction professionals will require social sensitivity and the capability for correct judgement. In order to assume these notions as the primary basis for every future step, students will need to learn during their education to create and think in means of wider concepts and the effects design and construction will cause on every user.

Only if ethic and open-mindedness is treated and trained during the education and formation process of design and construction professionals, future degree holders will think of universal design and universal access as of something self-evident, when practicing their profession!

9 Conclusions

Spaces creating and evoking feelings of everyone's acceptance encourage all citizens to participate actively and equally in all kinds of social and economic activities of today's society, from every-day-life habits to tourism, entertainment and so on. This notion constitutes the common goal of all European countries and prevails more and more in new design and construction projects.

This is especially important nowadays, as it is a fact that matters of architectural and urban accessibility, universal design and social integration become more and more important. The degree of information and sensitisation as regards accessibility and the social impact of integrating people with disability and people with reduced mobility into society through architecture constitute significant key elements in the worldwide effort and need to be supported urgently by all means – foremost by education!

The degree of information and sensitization plays an important role, especially as regards education. Universal Access is more than simply placing a ramp. It is evident that correct planning of space can enable, rather than disable. In conclusion, more weight should be given to the organization of relevant information courses and practice exercises, starting at the level of educating future design and construction professionals and ending at the continuing formation of practicing ones. Perhaps project-based learning with models [13] and malfunctioning buildings could be a solution.

"Flexible architecture" is the key word today, but unfortunately this trend does not necessarily incorporate Universal Design-criteria. Obviously, it could quite easily become the over-all goal. Social sensitivity is required, correct judgment and the capability to create and think in means of wider concepts and their effects on every user. Knowledge has to be transferred to future and practicing design and construction professionals, that:

- Universal Design regulations do not lead to boring, trite and ugly solutions!
- the rise of total construction costs of completely accessible spaces and buildings solely consists of 1%-2% if provision is made on time! [14]
- Universal Design does not limit imagination and inspiration!

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Picture References:

Pic. 1: Goldsmith, S., *Universal Design. A manual of practical guidance for architects*, Architectural Press, Oxford, 2000, p. 3 (revised by the author)

Pic. 2: by courtesy of Prof. W. Zagler, Fortec-Institute, TU Vienna.

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