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EDUCA4ALL IO4 Educational Programme

Fundación ONCE | UCL | Brunel University London | ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA | Universidad Francisco de Vitoria UFV Madrid

IO4
"Educational Programme.
Proposal for Arch. And civil Eng
University Degrees in EU"

EDUCA4ALL
DESIGN FOR ALL

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1. INTRODUCTION

1.1. Education on D4ALL in Architecture and Civil Engineering curriculum

Although in the training of any profession, Accessibility and Design for All is a component to consider, in some disciplines, such as Architecture and Civil Engineering, the direct relationship with the creation of spaces has a greater relevance and impact on Accessibility of the environment that surrounds us.

Reasons for putting in place study programs in Arch. & Civil Eng.

Thus, the implementation of UA&D4ALL in the Architecture and Civil Engineering curricula is perceptive due to the combination of the following three reasons:

1. Adaptation and updating of the training contents, in tune with the development of technologies, innovations and new social demands.
2. Respond to the requirements of the national regulatory legal framework of many of the European countries.
3. Adapt to the Bologna Agreement as a framework for wider and more effective ways of learning and outcomes.

Fields within Arch. & Civil Eng. which deal with UA&D4ALL

On the other hand, in these two disciplines there are different areas of work in direct relationship with the UA&D4ALL: land planning, urban planning, roads and public spaces, squares, parks and gardens, buildings and facilities for public use, signalling and orientation systems, security systems, beaches, paths and natural spaces, enclosures and buildings of a monumental character ... Therefore, it is clear that Architects and Civil Engineers need to have a training in UA&D4ALL for the exercise of their profession.

Training strategy in UA&D4ALL

To carry out this objective, the following guidelines are established for this training strategy:

1. Bear in mind that the UA&D4ALL is not something complementary to add at the end of the training, but that it has a complex relevance like other disciplines within the curricular contents and, therefore, it is a matter to be considered on a mandatory basis, not as optional;
2. Understand the UA&D4ALL as a transversal discipline, to be integrated in each of the different areas of knowledge of the Study Plan and in need of consideration by all Departments;
3. This knowledge must be transmitted with the greatest possible rigor, so it is necessary that the teachers responsible for its delivery have the necessary training in UA&D4ALL;
4. Training in UA&D4ALL must include both basic fundamentals and practical applications, so that they allow the student to perceive the need for accessibility from their own experience;
5. Appropriate methodologies should be used as well as the consideration of Ergonomics and Technology as background instruments in all the contents about UA&D4ALL;
6. The possibility of expanding knowledge about UA&D4ALL beyond the basic contents should be considered, with a specific subject on UA&D4ALL of an optional nature.

1.2. Educational Programme in Educa4all Project

The EDUCA4ALL project develops its objectives through three strategies that are specified in three deliverable documents:

1. **Self-assessment:** As a necessary reference of the starting situation of each University. A quick and easy self-assessment test has been designed and validated in order to assess its results and be able to personalize the next steps and thus achieve greater efficiency in the process of each University.
2. **Training of Trainers:** For a correct implementation of quality in students, adequate prior training of teachers is essential. It is therefore a key element that is developed in the second deliverable, where the contents are detailed as well as different formats and possible options for a better adaptation to the circumstances of each University.
3. **Educational program:** The appropriate way, after the Bologna process is to propose the implementation of UA&D4ALL in university curricula is through the definition of specific learning capacities. Thus, in this third document, a capacity matrix has been defined and validated that allows each university to adapt its Study Plans by integrating these new learning capacities on UA&D4ALL.

2. EDUCATION ON UA&D4ALL IN ARCH. AND CIVIL ENG.

2.1. Structure of the proposal

Methodology

For the definition of the Educational Program in the project, the following methodology has been followed:

1. Initial design of competencies: debating and specifying among team members which competencies are appropriate to propose.
2. Validation: contrasting this initial list of competencies with curricula of each of the six degrees analysed.
3. Compilation of opinions and evaluations of other inputs of a practical nature about UA&D4ALL.
4. Review of competences: adjusting and integrating the detected observations, grouping the different competencies into thematic blocks, and structuring them in a matrix to facilitate their use.

Instruments

The main tool of this phase is the UA & D4LL Competency Matrix (see Annex A). Thus, in the form of a table, all the competencies are numbered, grouped by subject, compared to the different subjects of the study plan, grouped by departments. At the crossroads, it is possible to identify in which subjects this competence is or could be easily considered. The result will tell us which competencies are covered by one or more subjects and which competencies are not yet considered in the study plan.

The annexes to this document include both the blank matrix table, as an instrument to be used by other universities, as well as the completed competency tables of the degrees analysed in the project universities.

2.2. Competences and learning results in UA&D4ALL

Specific Competences (SC) in Universal Accessibility and Design for All (UA&D4ALL) recommended for acquisition in Architecture and Civil Engineering degrees is described in following groups:

Basic Abilities

- SC-01 To know the fundamentals and general principles of UA&D4ALL: importance for the profession, basic concepts ...
- SC-02 To define and include UA&D4ALL criteria and technical specifications in new and renovation works and projects in the built environment.
- SC-03 To know how to apply the criteria in the different stages of works: planning, design, construction (in new works), ... or redevelopment, refurbishment, management, ... (in existing buildings or infrastructures)

Humanistic Abilities

- SC-04 To acknowledge Human Diversity and its different needs and requirements: (physical, sensorial, and cognitive diversities). General concepts, ergonomic fundamentals, aging and environment relationship, ...
- SC-05 To devise and conceive the project and the construction focussed on the end user (Universal Design, functional capacities, person-environment interaction, ...)
- SC-06 To know how to apply Legal framework and technical rules in UA&D4ALL in a consistent and imaginative way: mandatory accessibility regulations and other reference standards on UA&D4ALL

Urban Abilities

- SC-07 To know and apply UA&D4ALL criteria in urban planning: the city of people, urban accessibility management, tools for an inclusive city, specific intervention projects for improving urban accessibility...
- SC-08 To know and apply UA&D4ALL criteria in Transport: infrastructures, transport stops, parking spaces, accessible pedestrian mobility (vulnerable users), interaction with vehicles (bike lane, garages) ...
- SC-09 To know and apply UA&D4ALL criteria in the Urban Public Space: streets for all pedestrian routes and crossing points, urban elements (pavements, urban furniture, equipment...)
- SC-10 To know and apply UA&D4ALL criteria in Natural Environments (landscaping): Parks and gardens, beaches, playgrounds, tourist areas and viewpoints...

Construction and Systems Abilities

- SC-11 To know and apply UA&D4ALL criteria in Structures: Bridges, pedestrian walkways, viaducts, underground structures (tunnels, parking lots...)
- SC-12 To know and apply UA&D4ALL criteria in Environmental Conditions: lighting (natural and artificial), acoustics, thermal conditioning (temperature, humidity...)
- SC-13 To know and apply UA&D4ALL criteria in construction systems: accessibility characteristics of materials (texture, colour, slipperiness...), how to define and develop the construction detail of accessible elements.
- SC-14 To know and apply UA&D4ALL criteria in Safety: evacuation in emergency events, prevention of workplace risks

Projects Abilities

- SC-15 To know and apply UA&D4ALL criteria in the key elements of the building: level changes (stairs, ramps, lifts, platforms, escalators...) transition points (corridors and doors), sanitary spaces (toilets, showers and changing rooms)
- SC-16 To know and apply UA&D4ALL criteria in Housing: flexibility of the domestic space over time, new housing projects, intervention in existing building (common areas, interior of the house)
- SC-17 To know and apply UA&D4ALL criteria in Public Use Buildings: Sport facilities (sport centres, swimming pools...), buildings of great concurrence (stadiums, theatres, exhibitions, ...), administrative, cultural and educational buildings, work centres (offices, factories...)
- SC-18 To know and apply UA&D4ALL criteria in the existing built environment: accessibility during construction works, alternative solutions and reasonable adjustments in renovation projects.
- SC-19 To know and apply UA&D4ALL criteria in Heritage: accessibility: Monuments and Protected Buildings, Historic Centre of the cities.

Cross Abilities

- SC-20 To know and apply UA&D4ALL criteria for an easy understanding of the built space (wayfinding); concepts and strategies targeting indoor and outdoor spaces
- SC-21 To know how to apply New Technologies on UA&D4ALL: Technological applications for Accessibility in the urban space, home automation, domotics, internet of things...
- SC-22 To know how to apply the Management of UA&D4ALL: Maintenance (preventive and corrective), management (policies, protocols...), conformity assessment (audits, certifications) and consulting in UA&D4ALL.

2.3. Contents of the teaching modules in UA&D4ALL

Modules to consider:

As mentioned before, the contents of UA&D4ALL are presented with the following structure in modules:

- **Basic Abilities:** Definitions and basic concepts about UA&D4ALL. Differences in performance between new projects and intervention on existing buildings, as well as particularities of application for each stage of intervention: design, construction, maintenance.
- **Humanistic Abilities:** Development of the different needs and uses of the built environment based on human diversity. Considerations for the project and construction to be user-centred. Knowledge of the legal framework in UA&D4ALL.
- **Urban Abilities:** UA&D4ALL criteria in Urban Planning, Transport, Public spaces, and natural environments.
- **Construction and Systems Abilities:** UA&D4ALL criteria in Structures, environmental conditions, accessibility characteristics of materials, safety...
- **Projects Abilities:** UA&D4ALL criteria in the key elements of the building, Housing, Public Use Buildings, existing built environment, Heritage...
- **Cross Abilities:** UA&D4ALL criteria in wayfinding, application of new technologies in the built environment, UA&D4ALL management, maintenance, and consultancy...

Development of each module

To achieve these specific competencies, it will be necessary to consider:

1. Theoretical Contents: Development of the theoretical contents about UA&D4ALL for each of the topics.

2. Practical Contents: Practical applications in different scenarios and with different case studies.
3. Experiential Contents: Workshops and events that provide students direct hands-on experience about the needs of UA&D4ALL.

The definitive formalization of each of these categories will depend on each university, as well as the combination of the different variables in the form of work:

- Individual / group work
- Face-to-face / virtual work

3. CASE STUDIES. RESULTS

3.1. Results of the partner Universities

Each of the Specific Capacities in UA&D4ALL has been reviewed in relation to each subjects of the different curricula of the case studies. It has been assessed whether the corresponding contents and skills on UA&D4ALL are considered or could be considered with reduced efforts in each subject. In some cases, the SC in UA&D4ALL is covered by one subject, in other cases it is covered by several subjects, and in other cases it is not covered at all subject. From the analysis of the data obtained (see complete tables in the annexes) the following conclusions can be drawn for each case study:

Results at the Brunel University Department of Civil and Environmental Engineering

In this curricula, the possibilities to include the specific capacities in UA&D4ALL are concentrated on the Basic Considerations and some of them in a punctual way, such as Accessibility in Transport, consideration of Accessibility in Safety issues, or the Management of Accessibility and its Maintenance.

Results at the School of Civil Engineering, UCL

In the University College of London, Civil Engineering degree almost all SCs in UA&D4ALL are covered or could be included without great difficulty. The widely covered areas are Basics SC and Humanistic SC. The areas with the greatest room for improvement are Projects SC and Cross SC.

Results at the Civil Engineering Department of the UNIBO

At the University of Bologna, the Civil Engineering degree covers or could cover almost all SCs in UA&D4ALL. The areas of Basics SC, Urban SC and Construction & Systems SC stand out as strong points (SC best covered by various subjects). Legal Framework and application of New Technologies in UA&D4ALL are the pending integration capacities.

Results at the Department of Building and Architecture Engineering of the UNIBO

The UNIBO Architecture Study Plan contemplates the possible integration of almost all SCs into UA&D4ALL. As strong points, the areas of Construction & System SCs and Projects SCs stand out. The UA&D4ALL competencies in Legal Framework, Planning and Transport have the greatest margin for improvement.

Results at the School of Architecture, UCL

At Bartlett School of Architecture, University College of London, Universal Accessibility and Design for All is considered globally (fundamentals) in all subjects, considering the applicable regulatory framework. However, the detail on specific capacities in the different areas (projects, construction, urban planning ...) is not considered.

Results at the School of Architecture of the Univ. FDV

The Architecture degree of Francisco de Vitoria University has a curricula that can integrate the 22 specific UA&D4ALL considerations in this project. It is also significant that many of them are covered by various subjects, so their consideration from different points of view would be guaranteed. The strengths (specific capabilities best covered) are the Basics SC and the UA&D4ALL in Public Use Buildings.

3.2. Summary of results

The following table summarizes and groups the results of the different curricula analysed:

Table 1 UA&D4ALL COMPETENCES RESULTS TABLE

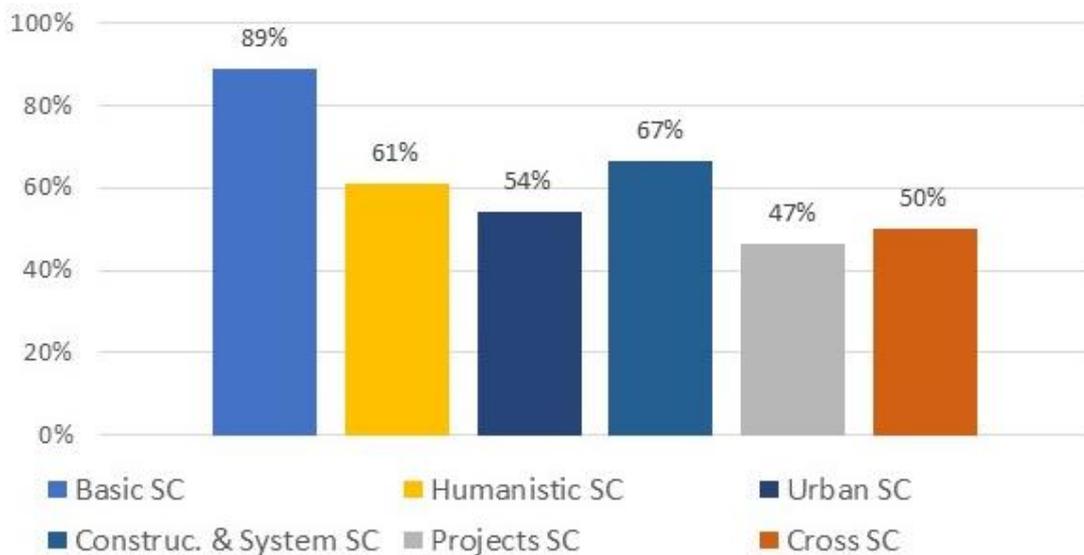
<i>D4ALL COMPETENCES - case study data -</i>		<i>Architecture</i>			<i>Civil Engineering</i>			<i>Curricula that consider it</i>
		<i>UFV</i>	<i>UNIBO</i>	<i>UCL</i>	<i>BRUNEL</i>	<i>UNIBO</i>	<i>UCL</i>	
Basic SC	<i>SC01</i> ... Fundamentals of UA&D4ALL	11	2	12	3	5	1	6
	<i>SC02</i> ... UA &D4ALL in built environment	6	4	0	1	9	1	5
	<i>SC03</i> ... UA&D4ALL in the different stages of works	4	3	0	1	5	1	5
Humanistic SC	<i>SC04</i> ... UA&D4ALL, in Human Diversity	4	1	0	0	2	1	4
	<i>SC05</i> ... project focussed on the end user	6	1	0	0	2	1	4
	<i>SC06</i> ... Legal framework in UA&D4ALL	1	0	12	0	0	1	3
Urban SC	<i>SC07</i> ... UA&D4ALL in urban planning	3	0	0	0	3	0	2
	<i>SC08</i> ... UA&D4ALL in Transport	3	0	0	1	3	1	4
	<i>SC09</i> ... UA&D4ALL in Urban Public Spaces	5	1	0	0	4	1	4
	<i>SC10</i> ... criteria in Natural Environments	5	1	0	0	5	0	3
Construc. & System SC	<i>SC11</i> ... UA&D4ALL in Structures	5	7	0	0	4	1	4
	<i>SC12</i> ... UA&D4ALL in lighting, acoustics, thermal ...	3	3	0	0	4	0	3
	<i>SC13</i> ... UA&D4ALL in Construction systems	4	14	0	0	7	1	4
	<i>SC14</i> ... UA&D4ALL in Safety	1	7	0	1	2	1	5
Projects SC	<i>SC15</i> ... UA&D4ALL in key elements of the buildings	4	10	0	0	5	1	4
	<i>SC16</i> ... UA&D4ALL in Housing	4	4	0	0	0	0	2
	<i>SC17</i> ...UA&D4ALL in Public Use Buildings	6	4	0	0	0	1	3
	<i>SC18</i> ... UA&D4ALL in existing buildings and urban spaces	3	13	0	0	3	0	3
	<i>SC19</i> ... UA&D4ALL in Heritage	2	10	0	0	0	0	2
Cross SC	<i>SC20</i> ...UA&D4ALL in Wayfinding	2	8	0	0	4	1	4
	<i>SC21</i> ...UA&D4ALL in Technological applications	1	0	0	0	0	0	1
	<i>SC22</i> ... Management & Maintenance in UA&D4ALL	4	10	0	2	3	0	4

From the comparison of the results in the different case studies the following conclusions can be drawn:

Results by SC areas

In general, the Basics SC Area is the group of capacities that is covered by all the analysed case studies. This group includes the capacities related to Fundamentals and Legal Framework, among others. It seems that the integration of the contents and skills to achieve these capacities could be one of the first objectives to be programmed, both due to its relevance (it is the base of the rest) and for the acceptable difficulties in achieving it.

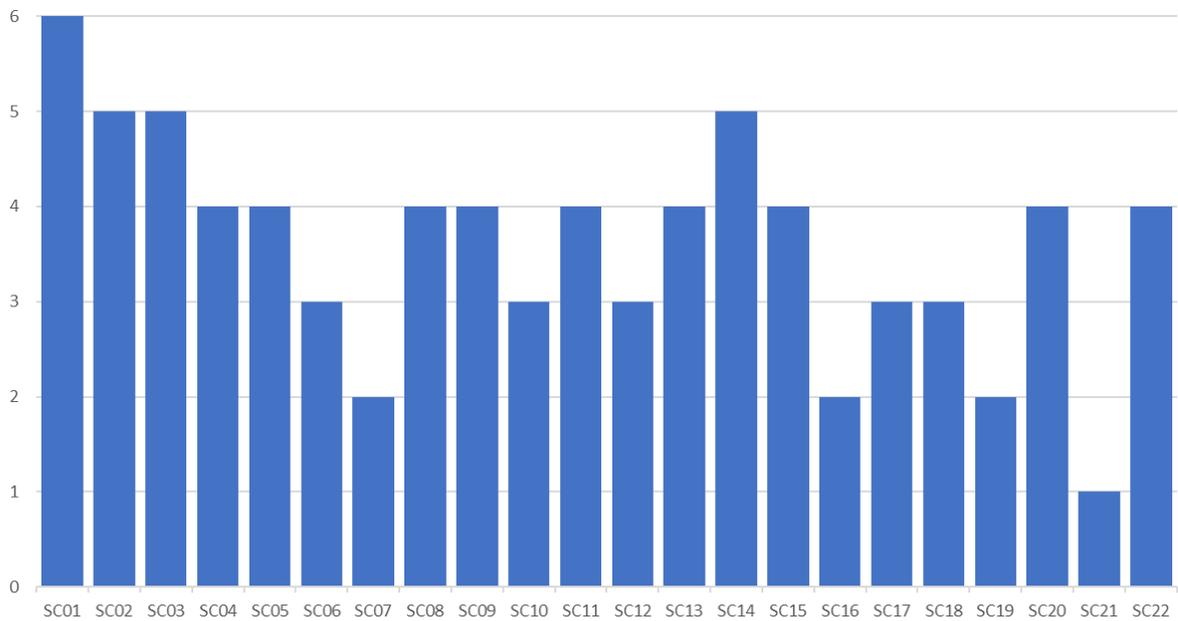
Graphic 1 CURRICULA IMPLEMENTATION CHART



Results by Specific Capacities

The results of the different case studies for each of the different specific competences of Universal Accessibility and Design for all (SC-UA&D4ALL) are integrated in the following graph:

Graphic 2 UA@D4ALL SPECIFIC COMPETENCES CHART



The specific capabilities in UA&D4ALL which appears to be easier to implement according to the results obtained (more universities have covers or could cover them without great difficulties) are:

- SC01: Fundamentals of UA&D4ALL
- SC02 UA&D4ALL in built environment
- SC03 UA&D4ALL in the different stages of works
- SC14 UA&D4ALL in Safety

On the other hand, the UA&D4ALL SCs are more difficult to integrate into the analysed curricula are:

- SC07 UA&D4ALL in urban planning
- SC16 UA&D4ALL in Housing
- SC19 UA&D4ALL in Heritage
- SC21 UA&D4ALL in Technological applications

4. OTHER INPUTS FOR UA&D4ALL EDUCATION PROGRAM

Within the university environment, and as case studies, practical applications that provide knowledge and therefore enable skills on UA&D4ALL are considered. In particular, two different applications have been analysed:

- Experiential summer courses on Design and UA&D4ALL;
- Applied Research Projects on UA&D4ALL.

4.1. Practical applications

Practical and experiential workshops

Francisco de Vitoria University in Madrid has been organizing a summer course for several editions where UA&D4ALL is the central axis of work. With an international vocation that encourages the exchange of different realities and the organization of a multitude of events and activities that favours first-person experiences, competences are achieved that are more difficult to achieve in the regulated teaching of theoretical classes. Teamwork, masterclass, guests, visitors and similar, are integrated with the architectural project proposal that gives continuity to the whole process. Annex B develops in detail the organization and content of these courses.

Associated research projects

The UCL through PAMELA (Pedestrian Accessibility Movement Environment Laboratory) develops applied research projects where UA&D4ALL have a relevant role and where students also have participation. Thus, through specific applied research projects on UA&D4ALL, students achieve relevant competencies in this matter. Annex D details the operation of PAMELA.

4.2. References of other works on competences in UA&D4ALL

Study on UA4D4ALL capabilities in Spain

The ONCE Foundation has led a project to assess the level of implementation of UA&D4ALL capabilities in the different university degrees in Spain. This global study can complement the results of the present investigation in EDUCA4ALL, being able to contrast if the reality of Architecture and Civil Engineering is similar or different to other degrees of Architecture, as well as if the Spanish reality is similar or not to the reality of other places in Europe. The details of this project are described in Annex C of this document.

5. CONCLUSIONS AND FINAL PROPOSAL

1. The competences of UA&D4ALL in the degrees of Architecture and the degrees of Civil Engineering are very similar, so their analysis can be carried out jointly since the differences are nuances, not relevant in this scale of study.
2. The inclusion of UA and D4ALL competencies in the analysed curricula appears to be feasible, especially in basic UA&D4ALL specific capabilities and Safety and Security.
3. Limitations are often related to the restrictions due to the planning of the courses which are generally to be agreed on a wide basis and well in advance with respect to the actual implementation of the courses.
4. Universities have some specific capabilities, covering fundamentals of UA&D4ALL but in a disjointed manner. More jointed approach of the contents and providing training to educators will be the priority.
5. Despite some flexibilities in content design and encouragements to widen education to everyone, the initiative is very much driven by the individual academic rather than a concerted effort led by the accreditation bodies.
6. At the university level, limitations are also related to the lengthy approval process for any course modification. Often this takes 1-2 years before implementation.
7. It remains without detailing the way to acquire each of the competences, which will require in most cases a combination of theoretical content, practical applications and experiential events.

6. ANNEXES

Some documents are attached in this block that, without being decisive in the project, can be a useful application tool, or allow to clarify and illustrate the contents of the project

- ANNEX A: Competence Tables
- ANNEX B: SAW (Summer Architectural Workshop)
- ANNEX C: Implementation of “Design for all” training in Spanish universities
- ANNEX D: Design for All: The Learning Philosophy at PAMELA and PEARL

ANNEX A: Competence Tables

Number of subjects who consider this SP		Subject	Area / Department	ECTS	Specific Competences in UA & D4ALL		Degree:
							University:
0	0	SC01	... Fundamentals of UA & D4ALL	Basic SC	Specific Competences in UA and D4LL		
0	0	SC02	... UA & D4ALL in built environment	Humanistic SC			
0	0	SC03	... UA & D4ALL in the different stages of works	Humanistic SC			
0	0	SC04	... UA & D4ALL, in Human Diverstiy	Humanistic SC			
0	0	SC05	... project focussed on the end user	Humanistic SC			
0	0	SC06	... Legal framework in UA & D4ALL	Urban SC			
0	0	SC07	... UA & D4ALL in urban planning	Urban SC			
0	0	SC08	... UA & D4ALL in Transport	Urban SC			
0	0	SC09	... UA & D4ALL in Urban Public Spaces	Urban SC			
0	0	SC10	... criteria in Natural Environments	Urban SC			
0	0	SC11	... UA & D4ALL in Structures	Construc. & System			
0	0	SC12	... UA & D4ALL in lighting, acoustics, thermal cond...	Construc. & System			
0	0	SC13	... UA & D4ALL in Construction systems	Construc. & System			
0	0	SC14	... UA & D4ALL in Safety	Construc. & System			
0	0	SC15	... UA & D4ALL in key elements of the buildings	Projects SC			
0	0	SC16	... UA & D4ALL in Housing	Projects SC			
0	0	SC17	...UA & D4ALL in Public Use Buildings	Projects SC			
0	0	SC18	... UA & D4ALL in existing buildings and urban spaces	Projects SC			
0	0	SC19	... UA & D4ALL in Heritage	Projects SC			
0	0	SC20	...UA & D4ALL in Wayfinding	Cross SC			
0	0	SC21	...UA & D4ALL in Technological applications	Cross SC			
0	0	SC22	... Management & Maintenance in UA & D4ALL	Cross SC			

ANNEX B: SAW (Summer Architectural Workshop)

A successful 3 year teaching experience 2018-19-20

THE TRANSFORMING VIEW

ARCHITECTURE FOR ALL

A NEW WAY OF TEACHING



The Gate of Versailles, Olafur Eliasson

THE TRANSFORMING VIEW

SAW UFV 2020 MADRID

V SUMMER ARCHITECTURAL WORKSHOP
UNIVERSIDAD FRANCISCO DE VITORIA
29/JUN-24/JUL 2020

 Universidad
Francisco de Vitoria
UFV Madrid



Image 1 Teachers and students in the 2020 SAW. First on-line edition.

REVIEWING “THE PURPOSE” (Looking for the architecture’s MAIN TARGET)

Architecture, like almost everything, is being entirely revised due to the imperative sign of the times. New design processes, new structures of architecture studios, new laws, new materials, new technologies, new computer programs, new and changing family compositions, new types of leisure, new teaching, on-line relations and social media, imposed social distance, changes in urban mobility, new sensitivity towards accessibility for all...

All this means that architecture, which for centuries remained very stable with a slight and slow evolution of systems and styles, now needs a deep and urgent revision.

It is necessary to rediscover "**what is the main target of architecture**". That goal which could not be ignored for it would distance it from its ultimate purpose and reason to exist. Three radical claims are worth considering to focus on the main target.

- Architecture is a "**Fine Art**" and therefore seeks excellence and beauty to provide spiritual delight to those who enjoy it.
- Architecture is the one and only Fine Art that stems from a "**necessity demand**". The rest are dispensable for the survival of the human being, architecture is ESSENTIAL for it.
- The only thing that can become center of its activity is the "**care for the person in all its dimensions**": physical, psychological, spiritual, and collective.

In order to properly produce "**architecture for all**" one thing is required: to place the person's needs as the main goal of all decisions, and keep in mind to serve the greatest number of people, trying to ensure that decisions do not exclude anyone and always put the common interest above the interests of a few.

The EDUCA4ALL project meets this objective by considering "the different capacities" as a challenge and a design factor that shapes the end result. The challenges are: how to teach this in architecture and engineering schools, without becoming just another imposition; how to awaken the sensitivity towards this reality; how to make it present, aspirational and a real centre of interest instead of living it as an uncomfortable design restriction that limits design freedom; how to make people understand that what is generally comfortable and friendly for the disabled can equally be so for everyone else; and that disability can be transitory, or permanent but we all usually experience a certain degree of disability through our lives, as a baby, injured, sick, or elderly.

METODOLOGY ACCORDING TO THE PURPOSE. Person centered Architecture

To achieve the objective of **transforming the Architectural view** and its inalienable purposes, it is important to introduce new ways of teaching that add complementary visions to the usual and traditional teaching and learning techniques. The best teaching seeks to produce “**significant learning**”. That is the kind of learning that remains in the memory because it produces a change in the life of the student. To reach this purpose there are three possible ways:

- **Spectacular teaching**, in which the student plays the role of a spectator of a show carried out in the classroom. This happens outside of him. He listens, but his interaction is minimal and if he does not learn that much.
- **Experimental teaching**, where the student is involved in doing things, whether they are experiments, exercises, projects ... The important and valuable part of learning is based on the student learning by doing.
- **Experiential teaching**, in which the student is immersed in an experience where he can live and feel in first person what he must learn. Depending on how revealing the experience is, will be the depth of the learning.

Generally, the educational process has focused almost exclusively on the first of the three possible ways, the Spectacular (where the teacher's ability to be interesting was crucial), and to a lesser extent on the experimental (where “homework” is usually interpreted as a necessary burden and responsibility). But combining the three forms and seeking to add a transformative experience is what makes the learning outcomes are more solid and transformative, especially for architecture, where much of the creative process comes from our own previous experience of the architectural space.

It is also necessary to teach students to “**wonder about things**”, before and in addition to “accumulating” facts about them. We need to create hunger for knowledge before trying to satisfy it.

It is important to start wondering about “**what for**” should something be learnt or done, and only when that first question is answered then look for the “**how**” can it be achieved.

It is advisable to promote **teamwork** tasks that require facing diversity not only in the end use but also in the creative process.

It is necessary to teach how to go from **SEEING**, (what is done with the senses without further analysis), to **LOOKING**, (what happens when a certain attention and search intention is paid to what is perceived) and from there to **OBSERVING**, (which is the scrutinizing gaze that understands the context and establishes desirable, creative, and sometimes unexpected relationships with it).

NEW RESOURCES AND DIFFERENT RESULTS according to the Zeitgeist

For these purposes and methodologies, and having a deep understanding of today’s students, it is necessary to use new ways of teaching approaches to the subject.

- **A closer teacher-student relationship**, that helps transform correction. The first and best teaching resource is to establish a relationship of sincere affection with the student. Know his name, his concerns, his obstacles. Make the student feel that it is important to the teacher and that an effort is being made to be by his side with good intention during the learning process. This ensures that the correction is not taken as an offense but as an aid. That the student does not defend himself and ignore the recommendations but considers them as a gift. This requires an effort of attitude, time and memory but gives very good results. It is starting the “person-centered architecture” with “student-centered teaching” which makes the process more credible and coherent.



Image 2 Teacher and students gathering in a relaxing atmosphere



Image 3 Teacher and students co-creating

- **Team building dynamics.** It is very important and transformative to include in the program some dynamics that allow all students to detect that they are neither seen as “transparent” nor “another brick in the wall”. That they are part of a learning team and that their presence and participation make learning more interesting and intense.



Image 4 Learning sign language

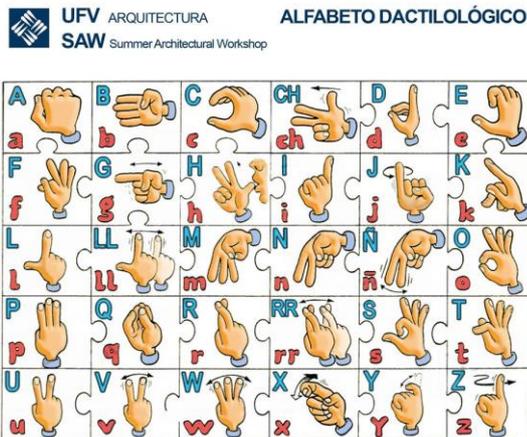


Image 5 Sign language alphabet

- **Readings** that help to deepen on architecture, being able to analyse it over its aspect. Today's students are very visual and read very little, when nothing at all. It would be scandalizing to know how many of our students have not read a book in their life (unless they were forced to do so at school). Providing a bibliography as part of the subject's documentation is a sterile effort because the fact is that nothing will be read from it. In the SAW program we have conceived a system in which we select two pages of an essential text or book and we dedicate the first hour of each day's session to comment upon it: What have I learned and what question did I ask myself as a result of the reading?

- This exercise has been shown to be of unusual power for several reasons. As the text is short, all the students read it. The students want to participate by presenting their conclusions, and whoever did not read feels out of the game. Reviewing the reading with all the students becomes an experience because they get to know each other from their personal conclusions to a common text. The multifaceted vision that is generated from every student's vision is usually very rich, because nuances appear that have the capacity to enlarge the content of the reading.



Universidad Francisco de Vitoria
SUMMER ARCHITECTURAL WORKSHOP

ARQUITECTURA
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TEXTO 1.2

Gio Ponti
Villa Plancharth a Caracas
2008

(Fragmento publicado en: A. Grecco, ed. Gio Ponti: Villa Plancharth a Caracas, Edizioni Kappa, Roma, 2008. Disponible online: <http://hanniaomez.blogspot.com/2008/02/orquidea.html>)

Armando y Anala Plancharth
"Somos un matrimonio senilto, sin hijos y prácticos, nuestras amistades no son de etiqueta, pero nos gusta reunirnos con ellos con frecuencia. Nuestros hobbies son las plantas, los perros, los pájaros, los pescados (siempre hemos tenido acuarium pequeños), fotografías, etc."
(Carta del Sr. Plancharth, Hotel Splendido, Lugano, sin fecha)

Tiempo estimado de lectura: 15 minutos

RETRATO DEL CLIENTE

Rasgos dominantes y necesidades

En 1953, el matrimonio venezolano Armando y Anala Plancharth encargaron a Gio Ponti el proyecto de una villa en Caracas, la Villa Plancharth. El arquitecto realizó el proyecto y construcción de la casa desde su estudio de Milán comunicándose con sus clientes por correspondencia. Algunos fragmentos de esas cartas y otras conversaciones son ejemplares para ilustrar la descripción del cliente, sus necesidades e inquietudes al inicio del proyecto.

Cuando a mediados de junio del 53 los Plancharth arriban al número 14 de Via Dezza en Milán, el estudio de Ponti, Fornaroli y Rosselli, donde habían logrado hacer una cita a través del Consulado de Venezuela en Italia, traían en mente muy claras las demandas que iban a hacer para la confección de su nueva casa. Una de ellas concernía a las orquídeas. Nada sino Gio Ponti podría tener éxito con semejante comisión.

Extasiados ante el rico espectáculo visual que era en ese momento el estudio, con maquetas colgando del techo y prototipos de diseño industrial, obras de arte diseminadas por el suelo y por las paredes, las mesas de dibujos abarrotadas de planos y dibujos y la editorial de Domus despachando desde una esquina, los Plancharth enmudecieron de placer. Fue Ponti, por lo tanto, quien hubo de romper el hielo con sus nuevos clientes sudamericanos, yendo directamente al grano. Y sentado a la mesa de dibujo, les formuló la pregunta inicial: "Bien. Díganme, ¿qué quieren ustedes de una casa?" Anala Plancharth le respondió inmediatamente: "Tengo enfrente una montaña preciosa que se llama El Ávila y quiero verla desde todas partes". Ponti dijo: "Muy bien, ¿y qué más?" Y ella contestó: "Quiero una casa que no tenga paredes". La claridad de las dos peticiones lo entusiasmó. Acto seguido, el arquitecto milanés se dirigió al señor Plancharth: "Y usted, ¿qué es lo que desea de una casa?" La respuesta atró en el acto: "Tengo una colección de orquídeas que deseo tener toda dentro de mi nueva casa". El arquitecto milanés pegó un salto: "¿Orquídeas? ¿Una colección completa de orquídeas?" —"Sí, como dos mil plantas"—, aclaró Plancharth. "¿Conoce usted lo que son las orquídeas?". El maestro contestó: "Solo conozco las flores. Son muy bellas, pero no he visto nunca el resto. ¿Cómo es la planta de las orquídeas? ¿Es una trepadora, un árbol o más

Página 1 de 2

Image 6 Extract from a text to be read in the class

bien, un arbusto? ¿Es grande o pequeña? ¿Cómo se cultiva, cómo se siembra? Puede que Gio Ponti, entonces de 63 años de edad, en toda su carrera jamás hubiera recibido una petición tan extravagante. Una domus orchiensis, un exótico showroom, un winter garden a la inversa, una serre para la jungla tropical, un belvedere vegetal... su curiosidad natural y su imaginación empezaban a dispararse. Hacer arquitectura para orquídeas en un espacio sin paredes contemplando la última cumbre andina, en el lejano Caribe...

Como un relámpago, una primera idea atravesó su mente. El arquitecto milanés sacó un rollo de papel de croquis e hizo un dibujo a grandes trazos. La señora Planchart lo recordaba muy bien. "Era una casa con arcos". —¿Le gusta?—, preguntó Ponti. "No, no me gusta", respondió ella. "¿Y por qué?", dijo él. "Porque yo quiero una casa moderna". Un grave silencio se impuso de nuevo entre los tres. Ponti extendió parsimoniosamente una nueva hoja de papel. Cuenta Anala Planchart que esta vez dibujó más detenidamente, y que en el nuevo dibujo fue apareciendo, poco a poco, como por arte premonitorio, lo que tres años y medio más tarde a grosso modo sería la Villa Planchart. Allí estaba ya, con su volumen cerrado y finto como una forma abstracta sobre la cima de la colina, allí su ligero techo flotando sobre las cuatro fachadas rotundas y rectangulares; allí las marquesinas aladas y las ventanas horadando de manera abstracta los blancos muros. Gio Ponti, de un vistazo, supo que ya no necesitaría preguntarles a sus clientes más si les complacía el diseño.

Página 2 de 2

Image 7 Extract from a text to be read in the class

- **Client Interviews.** Knowing who will be the user of what is designed and trying to understand their needs and desires is something very eye opening and transformative. But not only that, but also having the client himself evaluate the final result becomes very inspiring for the students and revealing for all, because finally we realize (teachers and students) that sometimes the deepest connection with the client It is not established by the most academically radical project, but by those who better listened and understood the user. So, we have an interview with the user at the beginning of the exercise to understand his needs, and once again at the end of it to verify if felt understood and the project shows it. This turns the relationship with the inhabitant into an indelible experience.



Image 8 Interview with the user. Needs



Image 9 interview with the user. Results

- **Visits and recognition of the place.** We talk about the “Genius loci”, but we rarely take the time to visit it with the students. Experiencing its temperature, its changing lights, its views, noise, smells, winds, vegetation, unevenness, accessibility, pedestrian and road traffic, way of access and being discovered gives more clues to a better design. Making a sensorial experience of the place and mapping it turns something inalienable and transformative. The physical space that hosts architecture is another starting point of the process that has a life of its own and finally coexists or fights with the result. It is better to take it into account from the very beginning.

- **Traveling as a source of learning.** There is no great Master of Architecture, who has not been a great traveller. Traveling broadens the horizon of knowledge, dismantles prejudices, makes character more flexible, opens the mind, and exposes those who experience it to a huge amount of new impacts that transform their vision of reality. The clash of cultures, being out of the comfort zone, feeling dangers, eliminating certainties and automatisms, dislodging from the already known generates a state of mind that permeates the soul and the intellect of those who experience it. If this also implies a change of language and culture, it places us as “cognitively disabled” in front of reality, because we partially ignore its rules, and it makes us review our certainties. This predisposes us to active listening, in addition to generating an atmosphere of camaraderie and team building like few other activities.



Image 10 Visit to the “Hemeroscopium” house from the architect Antón García Abril



Image 11 Visit t la Granja (Segovia-Spain)



Image 12 El Escorial's Monastery (Architect Juan de Herrera)

- **Teamwork.** This is one of the most powerful ways to experience plurality and the need for understanding. Source of innumerable conflicts and also an efficient promoter of new ideas. It forces everyone to go outside of their comfort zone to build something new, taking into account the talents and skills that the rest of the team can supply. It is a tool that must be planned and monitored very closely

because it can become an unpleasant experience for those who are unable to adjust. But in if properly leaded and monitored by the teacher, it is an important source of learning and creativity.



Image 13 The team



Image 14 Team interactions



Image 15 Teamwork



Image 16 Teamwork

- **Experiential contact with the disability.** These activities are a shocking experience to students. Especially if handled with skill, and if the experience is worked out and analysed to transcend the mere gaming experience. It can facilitate a first-person understanding of what constitutes an architectural barrier or an impediment to living architecture on equal terms. This helps to change the student's mind set and “design for all” awareness.



Image 17 Simulation for awareness

- **Group dinners.** Leaving the classroom and creating a space for interpersonal relationships around a few drinks, a meal or a dance is the definitive way to unite a work and learning group. Roles change and equalize; a union is generated as a community that greatly facilitates the everyday work. One themed dinner a week made the month-long work camp an unforgettable experience and created a true learning community.



Image 18 "Blind dinner" in restaurant Explore, Illunion Group



Image 19 Group dinner as a part of the program



Image 20 “El huerto de Lucas”, veggie food. “Sweden home” Madrid’s rooftops

LIGHTS THAT SHOW THE WAY, aspirational architects.

This can be satisfied through the common Spectacular educational format, where the work of masters who lead the way is shown without further interaction. And that is okay because it shows the reward at the end of the road. But it becomes highly transformative when that encounter is live with the person. When the master becomes a real person and not only a myth. When he shares his doubts and failures that went side by side with the successes. Teaching by example, by sharing the process and personal experience and not only the built work is highly transformative. Students need references, masters to emulate and follow, lights that illuminate their way and that show that the result of what they are trying is possible, desirable and admirable. Getting to knowing masters whose concern for the person is central, helps to give credibility to the process because it shows a goal that can be achieved by making these ingredients an essential part of the creative process. This activity requires a careful search for the guest and a prior explanation and contextualization of what is expected of their presentation, emphasizing topics that are often taken for granted and that are worth exploring.

 <p>IGNACIO VICENS 27/JUNIO/2018 SUMMER ARCHITECTURAL WORKSHOP 2018 MADRID EUROPE'S GATE ARCHITECTURE FOR ALL 18:00H - 19:00H - AULA 1/4</p>	 <p>CARLOS RUBIO 02/AUGO/2018 SUMMER ARCHITECTURAL WORKSHOP 2018 MADRID EUROPE'S GATE ARCHITECTURE FOR ALL 18:00H - 19:00H - AULA 1/4</p>
 <p>ALBERTO CAMPO BAEZA 09/AUGO/2018 SUMMER ARCHITECTURAL WORKSHOP 2018 MADRID EUROPE'S GATE ARCHITECTURE FOR ALL 18:00H - 19:00H - AULA 1/4</p>	 <p>EMILIO TUÑÓN 16/AUGO/2018 SUMMER ARCHITECTURAL WORKSHOP 2018 MADRID EUROPE'S GATE ARCHITECTURE FOR ALL 18:00H - 19:00H - AULA 1/4</p>

 <p>JUAN DOMINGO SANTOS SAW UFV 2019 MADRID 02/JUL 2019 12:00H AULA 1/4</p>	 <p>ANTÓN GARCÍA ABRIL SAW UFV 2019 MADRID 08/JUL 2019 12:00H AULA 1/4</p>
 <p>CARLOS LAMELA SAW UFV 2019 MADRID 15/JUL 2019 17:00H AULA 1/4</p>	 <p>IGNACIO VICENS SAW UFV 2019 MADRID 22/JUL 2019 17:00H ESTUDIO VICENS-BARRIOS</p>

 <p>DESIGNAR PARA EL HABITANTE VÍCTOR LEGORRETA 11/27/2019 10:00H AULA 1/4</p>	 <p>SMILJAN RADIC 11/27/2019 10:00H AULA 1/4</p>	 <p>ORDENARIO: EXTRAORDINARIO GIANCARLO MAZZANTI 11/27/2019 10:00H AULA 1/4</p>	 <p>LOGA: CONCEPTO DE VIVIENDA ANNA DEVIS + DANIEL RUEDA 11/27/2019 10:00H AULA 1/4</p>
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ENGAGEMENT AS A KEY TO CHANGE, personal involvement

To prevent the student from settling into the unsuccessful attitude of the viewer, their involvement is considered necessary from the first minute. That prevents them from being left out of the game, abandoning the course, or deciding that it does not affect them. Too often we learn things that we did not know what impact they have on the lives of others, and more importantly, on our own lives. Meaningful learning requires the permanent involvement and participation of the students.

In all the activities of the workshop, voice is given to all the students. At first students are freely invited to share their views and personal experiences of the activities carried out, and then some of the students who tend to hide are kindly invited to participate. This has two interesting effects. The students prefer to participate in the voluntary shift because the sooner they participate, the more unshared topics can be taken, while towards the end it is more complex to intervene without repeating things already said. The second effect is that everyone knows that they cannot inhibit themselves because at any moment they can be asked to participate, so it is necessary that they pay attention at all times so as not to repeat themselves and not to show their lack of interest. The same happens in teamwork or in rounds of questioning the guests. This positive tension that is generated helps everyone to be hooked and aware of what is happening without being able to disconnect for a single second.



Image 21 Students participating in a workshop.

A TRAJECTORY THAT ENDORSES THE PROCESS

Three editions of this summer Workshop have been held. Two face-to-face and one remote (due to COVID-19). The results and assessment of the students have been improving edition by edition. The “On-line” edition, which was feared to lose intensity as it was not face-to-face, and there was a doubt of losing interest for it was impossible to make the trips and common dinners, however it turned out to be the most moving of all. On that edition we were able to apply and enhance many of the accumulated learning in previous editions. The number of students and universities involved has been growing edition by edition. And around this workshop a community of former students has been generated who keep in contact and retain their friendship despite the fact, that the experience is only one-month long.



UPV space pavilion by Alberto Campo Basso

EUROPE'S GATE
SAW UFV 2018

III SUMMER ARCHITECTURAL WORKSHOP
UNIVERSIDAD FRANCISCO DE VITORIA
02-27 JUL 2018



THE ARCHITECTURE OF THE SENSES
SAW UFV 2019 MADRID

IV SUMMER ARCHITECTURAL WORKSHOP
UNIVERSIDAD FRANCISCO DE VITORIA
01-26 JUL 2019



The View of Pineda by César Pelli

THE TRANSFORMING VIEW
SAW UFV 2020 MADRID

V SUMMER ARCHITECTURAL WORKSHOP
UNIVERSIDAD FRANCISCO DE VITORIA
29 JUN-04 JUL 2020





Image 22 Members of 2018, 2019 and 2020 edition

TANGIBLE RESULTS

After the workshop with all the new teaching activities the final big issue would be: Are the projects better? Are they more person-centered? The answer is that, not only they are they better every year, but the feeling is that the personal transformation of the students is more profound and this is what they themselves express in the testimonies they leave us in their written feedback. As a good example of this, it is good to indicate that our last “real client” was BAREI (the singer Bárbara Reyزابال) and at the final review she was so touched by the results that she busted in tears several times. This could be understood as an excess of emotion in her behalf, but it was surprising when the 8 professors who were members of the tribunal and practically all the students who were taking the course were also in tears. Traditional teaching focuses on beauty and technical resolution of details, but emotion is very rarely achieved. Is it possible to ask for a better result of a summer workshop than changing the vision and experience of students towards architecture and its service to all people?



Image 23 Barbara Reyزابال during the final jury

ANNEX C: Implementation of “Design for all” training in Spanish universities

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Project description:

The ONCE Foundation for the Cooperation and Social Inclusion of Persons with Disabilities (hereinafter ONCE Foundation) signed an Agreement with the Royal Board on Disability for the implementation of a Universal Accessibility Program for Persons with Disabilities. One of the actions of this program was the Inclusion of Universal Accessibility criteria and Design for All in higher education.

ONCE Foundation signed as well, a service contract with the Conference of Rectors of Spanish Universities (hereinafter Crue Spanish Universities) to develop the project Implementation of training in Design for All in Spanish Universities, in order to actively contribute to provide models for the incorporation of subjects on design for all in the university curriculum.

The objective of the project is for university students to acquire skills in relation to disability. It seeks to promote the learning of the competencies that university students must acquire for the exercise of each profession in their relationship with people with disabilities, their rights and associated support needs, in order to offer universal and specific solutions. In short, it aims to train professionals capable of building an inclusive society.

Background and regulations:

The project is preceded by the publication in 2010 of six White Papers of Design for All in the University, which proposed the incorporation of Design for All in six university curricula. In that first phase, those university studies more directly related to the built environment and Information and Communication Technologies were selected, choosing the degrees of Architecture, Design, Information Technology and Telecommunications, Civil Engineering, and Industrial Engineering.

Crue Spanish Universities, with the support of ONCE Foundation, gave continuity in 2014 with a new project: Curricular Training in Design for All in Business Administration and Management, Law, Medicine, Pedagogy, Psychology and Social Work.

The Royal Board on Disability promoted from 2016, with Crue Spanish Universities and ONCE Foundation, the publication of six more proposals to the degrees of Political Science, Nursing, Pharmacy, Journalism, Sociology and Occupational Therapy.

And in the year 2017 two more publications corresponding to Tourism and Education degrees were developed.

Twenty work groups formed by teachers from different Spanish universities invested months to develop these tools, proposing ways to adapt these university curricula including the basic concepts of Design for All and Universal Accessibility.

In this sense, a premise included in the situation diagnosis study carried out before the first tool is fulfilled:

"Ensures that in the future these concepts will be part of all projects related to human activity thus giving effect to the Resolution of the Council of Europe on this matter" (White Paper on Design for All at the University, 2006).

There is an extensive regulation that supports the development of this project, which arises from the need to support university work to facilitate compliance with Royal Legislative Decree 1/2013, of November 29, which

approved the Revised Text of the General Law of Rights of persons with disabilities and their social inclusion, in whose Second Final Provision was stated:

The Government will encourage the universities to consider measures so that in the development of the curricula of their degrees the training in Design for All is included.

Other articles of Royal Decree 1/2013 legally support the objective of this project:

- The obligation of public authorities of Social awareness raising promoting recognition and respect for the rights and dignity of people with disabilities (Article 59).
- The need of specialized personnel to work with people with disabilities (Article 60).
- The need to train personnel who work with people with disabilities (Article 61).

Royal Decree 1393/2007 of October 29, which establishes the organization of official university education, establishes in its article 3 on university education and issuance of degrees:

From the respect and promotion of Human Rights and the principles of universal accessibility and design for all in accordance with the provisions of the Tenth Final Provision of Law 51/2003, of December 2, Equality of opportunity, non-discrimination and universal accessibility of persons with disabilities, and should include, in the curricula where applicable, lessons related to these rights and principles.

The Project also seeks compliance with Organic Law 4/2007, of April 12, which modifies the Organic Law of Universities (LOMLOU), which in its Twenty-Fourth Additional Provision, section 5, states:

All the Plans of Studies proposed by the universities must take into account that the training in any professional activity must be done from the respect and the promotion of the Human Rights and the principles of Universal Accessibility and Design for All.

Future of the project

Faculty is essential, so the project assumes the importance of teacher training and the need of materials to support them at the time of incorporate these concepts in their classes.

In order to achieve an inclusive university, the involvement of the institution and its teaching staff are essential, as is its recognition by the Quality Evaluation and Accreditation Agencies.

The project contributes with the elaboration of action protocols so that the quality evaluation agencies could value the inclusion of training in Universal Accessibility and Design for All in the university degrees.

Conclusions

The university trains. From universities, students are trained to be professionals with enough skills to adapting to a changing society.

Today university students are who will build the society of the future from their different professions.

On the other hand, about 10% of the population has a situation of disability and their limitations must be countered with supports and accessible services.

For these reasons, from our universities we must train in Equality, Universal Accessibility and Design for All.

ANNEX D: Design for All: The Learning Philosophy at PAMELA and PEARL

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Background

PAMELA (Pedestrian Accessibility Movement Environment Laboratory) has been in operation at UCL since 2006, aiming to develop the science behind accessible pedestrian environments, including how people interact with them, and therefore how these environments should be designed. PAMELA is a place where we can build life-size environments, including control over the lighting and soundscapes as well as the physical appearance of the environment, thus enabling research to take place in a 'real' environment, but under highly controlled conditions.

As part of this endeavour, the process of disseminating learning to students, practitioners and others has been a central part of the PAMELA mission. PAMELA has outgrown its capacity, so a new laboratory is being created to replace PAMELA. The new laboratory is called PEARL (Person-Environment-Activity Research Laboratory). PEARL is much larger than PAMELA and includes a lot more features of the environment.

The learning philosophy at PEARL is based on that at PAMELA, but as the research at PAMELA has developed, and with the increased opportunities at PEARL, it is opportune to review the learning philosophy and practice, and this is the subject matter of this document.

Learning Philosophy

The Learning Philosophy aims to facilitate educating people so that they can contribute to improved health, wellbeing and prosperity for all. In this particular case, we are dealing with people who are engaged with the environment in any way. This means the entire population, as everyone

must interact with their immediate environments as part of their daily life, even if those environments are very restrictive.

The focus is on ‘education’ not ‘training’: developing skills in the thought processes to create outcomes for all. These thought processes include perception and understanding, allocentricism, and the consideration of capabilities – which then invoke the creative processes to create outcomes for all. This means by default that everyone is considered in the design of an environment, whatever their needs. The primary point is to ensure that people can do the things they need in order to live well and improve the quality of their life and wellbeing, and that by doing this we can enable society to progress.

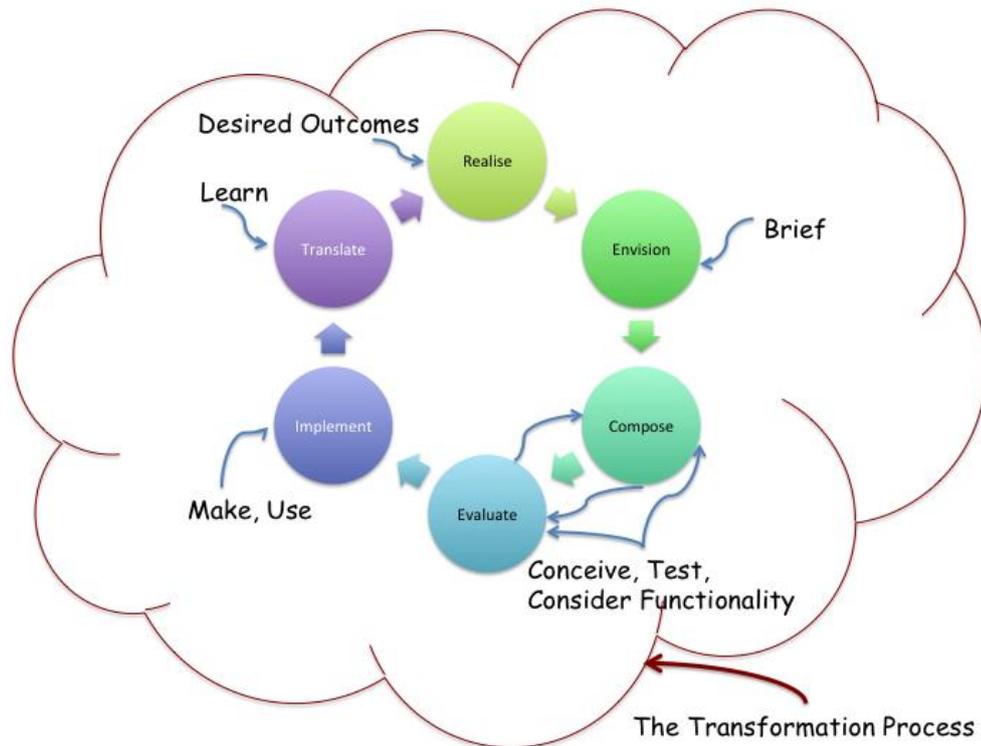
Another important part of the philosophy is the removal of the word ‘teaching’. We aim to create an atmosphere in which everybody learns, including those charged with running a course. The concept is that in an environment where everybody is learning, it is much easier for all to learn: there is little more intimidating than being in an environment where one person deems that they have the knowledge and everyone else does not.

The reality is that nobody has all the knowledge, and especially in a case like this, the students are likely to be more knowledgeable than any member of an academic faculty. The philosophy is that everybody can learn something from everybody else – what is important is the atmosphere of learning thus engendered, and this then facilitates the learning process for everyone in the area of the issues being considered on any particular occasion.

The philosophy is described in the graphic 3. The learning starts by *Realising* the world as it is and extracting from that a comprehensive definition of the problem to be tackled. Too many design and engineering programmes fail to include this – often handing the students problems to tackle, rather than enabling them to develop the skills to find out what the problem actually is. In the context of accessible design, this is a crucial component of the learning process, because nobody will come to a problem with a complete and comprehensive a priori knowledge of its extent for all people’s needs – so everyone will need to develop this from first principles for every problem they face.

The second stage is to *Envision* this realisation of the problem, so that it can then be tackled. A key component in this process is the study of Capabilities. In PAMELA and PEARL we do not talk about disability, we talk about Capabilities – what you *can* do rather than what you cannot, not because of some nicety of language, but because it is important to support both how people actually are, and how they tackle problems in the environment, and the requirements made of people by the environment in order to cope with it. This means that people learn how to think about reducing environmental capability requirements and how to balance these with a person's provided capabilities in relation to the challenge at hand.

The outcome of this stage is a picture of what needs to be done. Then, in stage three, the learning turns to *Composition*. We talk about composing rather than design, because this is about creating a new world, rather like a work of art, such as a piece of music, where the need is to fuse art and science to engineer a feasible solution that responds to the differences between required and provided capabilities. This – just as in music – means considering a multisensory approach, and of course considering time as well as space. So the learning has to consider all the potential ways of looking at time – not just the Newtonian clock, but also the Bergsonian sense of duration, the relativities associated with the question of simultaneity, and the concepts of differential speeds of time as exemplified by different elements in the environment system.



Graphic 3 Learning Philosophy in PAMELA and PEARL

Next, in stage four, we have to learn how to *Evaluate* the composition. This means evaluating performance, not just benefits and costs, but the extent to which it contributes to societal good, its comprehensive accessibility and what more needs to be done. It is often the case that enhancing one element of accessibility, another need is revealed, so it is important that the evaluation considers not only the intervention itself but also its effects on the rest of the system.

Then, having adjusted the Composition, maybe also the Envisioned version of the problem, and even in some cases it might be necessary to question whether the Realisation obtained in Stage one is actually appropriate, the next stage is to *Implement* the composition. Implementation is more than just ‘installing’ or ‘constructing’. So the learning has to consider all aspects of the implementation, including the evaluation of the implementation, as an inherent element of this stage of the process.

Stage 6 is the extension of the evaluation process that turns to the issue of ‘what have we learnt from the implementation?’. This can be loosely thought of as ‘How might this implementation be adapted to go elsewhere?’ – this is learning how to look at a solution in terms of its general

principles – what makes it work, what compromises had to be made to do that, there, and thus what can be learnt about ‘this example’ that could be applied elsewhere: what are the absolute must-haves as they are, what are the ‘could-be-adapteds’ and what are the must-nots to be taken into account for other implementations in response to this problem. Finally, it is important that the learning embraces the return to the *Realise* stage – how has this intervention changed the world, and thus how should we *Realise* the world anew? The whole process is about that transformation we are seeking towards a world that is accessible to all.

General Principles

This philosophy can only be adopted in a highly practical form. Both PAMELA and PEARL are facilities that can create worlds that can be used to provoke this approach to learning-by-doing, but also contemplating the underlying thinking processes that need to be in place in order to be learning-by-doing-the-right-thing. This includes close involvement of people with different capabilities so that the significance of their needs is central to the process – this is learnt-by-doing-the-right-thing-inclusively.

Disciplines are left outside the door. Previous notions of arts or sciences are also left outside. The philosophy is absolutely to fuse arts and sciences to push and probe the boundaries of what is possible so that what is needed can be done.

This does not mean that everyone has to learn everything about everything, which would clearly be impossible. It means that people need to learn what they do not know and the humility to seek advice and help: by following this philosophy, ‘solutions’ are not predefined prescriptions, simply picked up and put in place; the approach is one of creations of ways of meeting the needs for all, so the outcomes are not the implementation, but the better quality of life and wellbeing that results.

This might be delivered by something else entirely – the point is to learn how to observe and understand that – this is the importance of the translate stage, and why it must lead onto Realising the world anew.

What does a course look like?

At the moment we run a module on Accessible Design of Transport Systems, and this is taught in PAMELA. This course runs as part of a very conventional Masters in Transport. That is where the convention stops. This has no lectures as such, but episodes of thought, learning how to perceive the world in a different way, by challenging one's own perceptions of what the world looks, sounds, feels or smells like, by an immersive experience where changing experience is considered a possible thing to do.

All students experience a change in their perception of reality – so that they can learn how to try to understand the problems faced by others in dealing with a transport system. In PEARL, where there is more space than PAMELA, this will extend to creating a multisensory world, and learning about accessible design for all through doing that (PEARL will have trains and an aircraft as well as the more static built environment situation).

We also have a new Masters planned, which is about decision-making, where the programme structure is also based on the same six stages of this philosophy, but as the whole Masters is about this, each stage is considered in greater depth, and the final project is for the students to create 'something' following these principles.

Taking off

Rather than a Conclusion, this brief document closes by looking to the future. The model is to consider Arts and Sciences in relation to each other. 'Science' is based on looking backwards, and doubt – questioning knowledge from the past, whereas Art is based on taking experience and creating a future. Therefore, the fusion of arts and sciences is a necessary starting point for moving forwards. A key issue is the breaking down of the hegemony of the limited educational system with which we are having to deal, in which disciplinary boundaries are toughened to force knowledge to be compartmentalised. This prevents – or at least obscures - a comprehensive systemic view of the world – really, it is too late by the time students enter university – and especially a Master's programme – to be able to assume that a student's learning capabilities are in a suitable mode

for thinking about a problem as complex as accessibility. We can do a lot by educating students to go into the world with better thinking skills, but that is a long-term and very small contribution. We can do more by introducing this philosophy into the undergraduate curriculum (which we are doing), but really, we need to do more for more people. For this reason, at PEARL we are introducing a community programme in which people of all ages – including school students – can learn to think anew.

Principles for staffing numbers

1. Ability of academic staff to
 - a. Run a comprehensive PEARL graduate programme
 - b. Supervise doctoral students
 - c. Generate research funding
 - d. Generate government contracts
 - e. Generate industry contracts
 - f. Perpetuate curiosity driven research
2. Ability of the facility to provide transdisciplinary expertise
 - a. Through combination of academics, in-house
 - b. team of research fellows and technical staff
3. Ability to generate ongoing contracts with
 - a. Governments
 - b. Industry
 - c. Third sector
 - d. International organisations
4. Ability to create a strong community participation programme
 - a. With local communities around PEARL
 - b. With communities wider afield, including international

5. Ability to operate the functioning of the facility

- a. Technically
- b. Administratively
- c. Academically
- d. Intellectually
- e. Practically

In the business case, there is a rationale for numbers based on these principles, some of which generate income, but all of which are required in order for the facility to function at its world-leading exceptional level, or at all.

The original business case (2018), which was approved by UCL Council, allowed for a total of 43 staff:

- a. 6 new Academic appointments
- b. 16 new Technical Staff appointments
- c. 8 Research Fellow appointments
- d. 6 Administrative Staff appointments
- e. 5 Existing staff to be transferred to PEARL
 - i. 3 Technical Staff from PAMELA
 - ii. 1 Academic (Tyler)
 - iii. 1 Research Fellow (Adhitya)

Thus, a total of 41 staff, of which 36 would be new appointments.

Since then the landscape has changed in a number of ways.

- 1. The requirement for Masters programmes has increased (in order to provide ongoing teaching income).
- 2. The logistics of the technical staff means that there should be one more appointment (this is due to the split-shift arrangements required to maximise operational capacity).

3. The existing Research Fellow (Adhitya) will be one of the 8 Research Fellows, therefore the requirement is for 7 new appointments rather than 8.
4. The need to increase business opportunities requires two additional administrative appointments: Commercial Business Development Manager and a 3rd Sector Business Development Manager, this increasing the administrative staff cohort to 8, rather than 6. This is coupled with the need to provide administrative support to an increased number of Masters programmes.

This results in a new requirement:

- a. 8 new Academic appointments
- b. 17 new Technical Staff appointments
- c. 5 Research Fellow appointments
- d. 8 Administrative Staff appointments
- e. 5 Existing staff to be transferred to PEARL
 - iv. 3 Technical Staff from PAMELA
 - v. 1 Academic (Tyler)
 - vi. 1 Research Fellow (Adhitya)

Thus, a total of 43 staff, of which 38 would be new appointments.

There are 5 drivers that dictate the timing of new appointments:

1. Need for competent and safe operation of the facility.
2. Need for the staff to be properly trained in time for operations to commence in Spring/Summer 2021.
3. Need for Masters programmes to be developed and passed through the UCL approvals process in time for the earliest possible start following the start-in post of a new academic member of staff. This is approximately 2 years (depending on appointment date, but will not be less than this);
4. Need to be able to develop and provide the transdisciplinary expertise for research and commercial clients (a requirement of UKCRIC);

5. Need to be able to develop the commercial and other activity in order to bring in income to the facility as soon as possible.

We could conceive of two plans for implementation, A and B, but since drafting these plans, the Covid-19 pandemic has brought a new requirement from HM Government for PEARL to be able to handle Covid-related research as it pertains to the public environment. The additional requirements for this, which mean early appointments of all staff and some additional Covid-related staff, are included in Plan C.

