Co-funded by the Erasmus+ Programme of the European Union

BUILD SOLUTIONS

LIVING DESIGN TRAINERS' WORKSHOP

CONCLUSION REPORT

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CONTENTS

1 – FOREWORD

Building Urban Intelligent Living Design Solutions

Cities currently host more than half of the world population, which is projected to increase up to 70% by 2050 (UN, 2014). Already, cities account for 70% of global CO2 emissions (C40). With the expected population growth, cities would hence be the source of an estimated 85% of global GHG emissions.

There is a growing recognition and awareness that nature can help to provide viable solutions by using and deploying the properties of natural ecosystems and the services that they provide in a smart and 'engineered' way (EC). These living solutions provide sustainable, cost-effective, multi-purpose and flexible alternatives for various objectives. Working with nature, rather than against it, can further pave the way towards a more resource efficient, competitive and greener economy. It can also help to create new jobs and economic growth, through the manufacture and delivery of new products and services, which enhance the natural capital rather than deplete it (EC).

With that in mind, the big question is, why are nature-based solutions not used more to address the global urban challenges?

The main answer would be that there's a distinct skill and financing gap in the biotechnology sector. While we currently have great researchers in biotechnology, too often the commercialization and hence the implementation of their discoveries stumble due to a lack of personal experience in entrepreneurship and cooperation with industry leaders (Fritsch, 2010).

And even when most of those skills are present in a team attempting to commercialize a technology, another obstacle rears its head: the lack of short-term funding available to biotech start-ups and spinoffs (Swamidass, 2008). Recently, the High-Level Group for the European Innovation Council published their first recommendations which state that funding for disruptive, market-creating start-ups with deep-tech solutions (like biotech) is severely fragmented and doesn't meet the needs of the start-ups for developing the technology (http://ec.europa.eu/research/eic/pdf/eic_recommendations_set-1_2017.pdf). The lack of funding can be attributed to multiple factors, chief amongst them being the perceived risk and the huge capital expenditures necessary to develop sound biotechnology solutions.

Building Urban Intelligent Living Design Solutions (BUILD Solutions) project aims to set up transdisciplinary cooperation among universities and business, engaging students, teachers and researchers and providing them with the necessary entrepreneurial skills and connections to bring intelligent living solutions to the market, by investigating biological systems, creating smart design prototypes, business plans, plans for start-ups and working with accelerators.

The project's objective is to develop an experimental transdisciplinary educational system linking biology, intelligent design and business through several kinds of activities, such as courses for students and trainers, symposiums, development of educational resources, the set-up of an accelerator programme, launching an international call for ideas and creating new networks.

The project is co-funded by the Erasmus+ Programme of the European Union.

Living design solutions provide sustainable, cost-effective, multi-purpose and flexible alternatives for several urban challenges.

2 - LIVING DESIGN TRAINERS WORKSHOP, IAAC

2.1 Introduction

BUILD Solutions project is aimed at developing an experimental transdisciplinary educational system linking biology, intelligent design and business through several types of activities, including courses for students and trainers, symposiums, development of educational resources, the set-up of an accelerator programme, the launch of international calls for ideas, and the creation of new networks. Therefore, since one of the main objectives of the project is to introduce entrepreneurship education in the fields of biology, intelligent architecture and business, the project consortium is composed by both academic and industrial partners.

In this vein and in order to help structuring the transdisciplinary education programmes, BUILD Solutions have organized at the beginning of the project a set of 3 trainer workshops that aimed at sharing multidisciplinary knowledge among the three discipline trainers. In these sessions trainers from each discipline explained to the others basic technical concepts and educational methodologies that are commonly used in their respective fields so they can get familiarized with the content and terminology.

BUILDs develops an experimental transdisciplinary educational system linking the fields of biology, intelligent design and business.

The 3 Trainers workshops took place during the first months of the project, being the first at the University of Lorraine (M5, March 2019), the second at IAAC (M6, April 2019) and the third at the University of Vienna (M7, May 2019). Each Higher Education Institution ensured the participation of 2 staff members from each of their teaching and training teams, and each SME brought at least 1 staff representative. These Trainer Workshops were structured as a 3-days intensive programme where knowledge, concepts, and methods were shared in order to overcome the usual disciplinary barriers and to discuss the innovative modules and test them internally in peer learning sessions. As a result, experts were trained to be teachers at the Students Year Program and allowed them to get familiar with concepts belonging to the fields of biotechnology, design for urban resilience and business through a transdisciplinary lens.

The second BUILD Solutions Trainers' Workshop, titled Living Design Trainers Workshop, was led by IAAC and took place from the 3-5 of April 2019 in Barcelona, Spain. Having in mind the main project objective of developing an experimental transdisciplinary educational system where biology, intelligent design and business disciplines interrelate, the Living Design Trainers Workshop aimed at providing partners coming from the fields of biology and business with the basic learning tools about Intelligent Design concepts and courses set-up, in order to allow them to prepare their transdisciplinary students program.

IAAC cooperated with its industrial partner, Plant-e, to set-up the program. Plant-e contributed with its renewed expertise in translating biology concepts into the design products by sharing also their business and marketable experience. As introduced above, two members of the Higher Education Institutions (WU and UL) participated together with one staff member of the SMEs (CF, Econick, and Ersilia).

2.2 About the Organisers

The Living Design Trainers Workshop was organized by the Institute for Advanced Architecture of Catalonia (IAAC), with the support of Plant-e.

IAAC is an international centre for research, education, investigation working in educational programmes and applied research projects connecting biology, architecture and business to enhance cities sustainability and resilience. IAAC educational strategy is based on the learning-by-doing methodology: students are encouraged to develop their projects through prototypes, building them in IAAC FabLab, testing materials and projects performances.

IAAC is an international centre for research, education and investigation that expand the boundaries of architecture and design to address the challenges faced by humanity.

Plant-e is an academic spin-off from Wageningen University with vast experience in entrepreneurship, education, research, IP, and systems for electricity production from living plants. Their hands-on experience with translating biology concepts in design solutions, financing and other start-up challenges makes them a valuable partner for the entrepreneurship part. Plant-e holds patents to some of the earlier designs that were made. By including Plant-e in the knowledge alliance, access to important IP is secured, which offers opportunities for freedom to operate for new-to-establish start-ups.

2.3 Main Topics

The main topics addressed at the Living Design Trainers Workshop were the following:

1. **Definition of Intelligent Design**
2. **Intelligent Design in the Building Industry**
3. **Research on materials for Intelligent Design**
4. **Educational Programmes on Intelligent Design**
5. **Case Studies**

Trainers from the biology and business disciplines were introduced by IAAC experts to the basic notions, methodologies and tools of Intelligence Design, including the role of the building industry and the pioneer research on the different materials that can be used towards the design of more resilient urban re-naturalization spaces.

Trainers from the biology and business disciplines were introduced by IAAC experts to the basic notions, methodologies, and tools of Intelligence Design.

In addition, after accompanying partners through the analysis of a series of case studies in the city of Barcelona, IAAC trainers shared with them the innovative educational programmes developed at the Institute, including courses set-up, the pioneering content, structure and outputs, in order to inform the discussion on how to build the project's one-year transdisciplinary program.

2.4 Methodology

As previously mentioned, IAAC's Trainer Workshop was structured in a 3-days intensive program held in Barcelona in April 2019, with the attendance of a total of 16 participants, consisting of 9 trainers and 7 SMEs partners.

Day 1 was dedicated to introducing participants to the basic knowledge on Intelligence Design concepts, theories, and definitions, as well as to share with them how IAAC approaches its learning programs and the main educational outputs.

On Day 2 IAAC organized an exhaustive tour in the city of Barcelona aimed at exploring key iconic sites that served as case studies to expand on the theoretical notions introduced the previous day. They visited Mediatec (to explain the concepts and main features of a responsive building), then they went to the Sagrada Familia (to develop the notion of how digital manufacturing can be applied in the building industry) and finally they visited IAAC Valldaura Campus (as an innovation education facility focused on developing self-sufficient nature-based projects).

And lastly, Day 3 was devoted to the development of the year-transdisciplinary programme by exploring different methodologies for collaboration and the accelerator programme.

Sharing concepts, methodologies, and tools on Intelligence Design, towards the development of more resilient urban re-naturalization spaces

3 – OUTPUTS

3.1 Programme

As anticipated, this Living Design Trainers Workshop organized by IAAC succeeded in providing partners coming from the fields of biology and business with basic and key tools to understand the Intelligent Design discipline and how its courses are set up, with the main objective of informing the development of the transdisciplinary students programs.

Detailed workshop programme (download it here):

Day 1 - 3 April 2019

Knowledge sharing on Intelligent Design and Educational courses
Understanding Intelligent Design (IAAC - Room 103)

H10:00-10:45 - Lesson 1: Introduction to Intelligent design - Areti Markopoulou (IAAC)

- How can we define intelligent design
- Intelligent design in the Building Industry
- Intelligent design and research on materials

H11:00-11:45 - Lesson 2: Methodologies and Tools - Alex Dubor (IAAC)

- Parametric Design
- ICT (Sensors/Boards/Controllers/Platforms)
- Digital Manufacturing (Milling/3D Printing)

H12:00-12:45 - Lesson 3: Intelligent Design Products / 10 Case Studies - Federica Ciccone (IAAC) / Nanda Heshof (Plant-e)

H12:45-13:30 - Lesson 4: Intelligent Design Companies / Plant-e products Case Study - Nanda Heshof (Plant-e)

H15:00-15:45 - Lesson 5 - part 1: IAAC Educational Programmes - Mathilde Marengo (IAAC)

H16:00-16:45 - Lesson 5 - part 2: IAAC Courses Structure - Mathilde Marengo (IAAC)

H17:00-17:45 - Lesson 6: Case Study: Biophotovoltaic elements development course - Chiara Farinea (IAAC)

- Experts Involved
- Course Structure
- From the idea to the prototype
- Examples of projects developed by students

Day 2 - 4 April 2019

Case studies in Barcelona: Applications of Intelligent Design

H9:00-10:30 Case Study 1: Visit Mediatec (Responsive Building)

H11:30-13:30 Case Study 2: Sagrada Familia (Application of digital manufacturing to the building industry)

H15:30-17:00 Case Study 3: Valldaura Campus (Education facility for the development of self-sufficient/nature-based projects)

Day 3 - 5 April 2019

Workshops: Innovative educational programs development (IAAC - Room 103)

H09:00-11:00 Workshop 1: Yearly transdisciplinary programmes development - LIVING DESIGN Semester

- Presentation of the Accelerator Programme
- Development of methodologies for collaboration / Inputs from Partners

H11:30-13:30 Workshop 2: Intensive transdisciplinary programmes development - LIVING DESIGN Intensive Course

- Development of methodologies for collaboration / Inputs from Partners

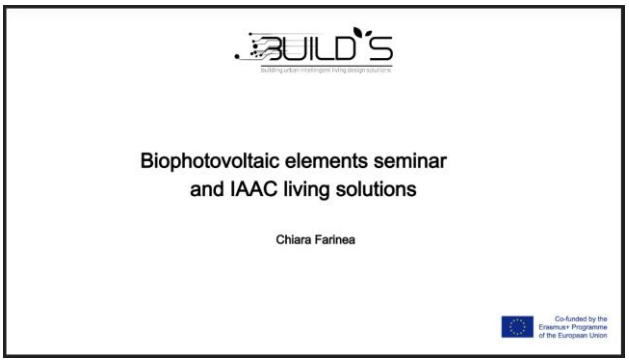
H14:30-16:30 Steering Committee meeting

- Review of BUILDs activities
- Updates on BIO-TECH Symposium

3.2. Partners presentations

IAAC, Chiara Farinea

Biophotovoltaic elements seminar and IAAC living solutions



Download it here

IAAC, Federica Ciccone

NBS Case Studies for BUILDs

Download it here

IAAC, Mathilde Marengo

Intelligent Design Education

Download it here

IAAC, Areti Marcopoulou

Intelligent Design: Responsive Architecture, Materials and Performance

Download it here

Plant-e, Tim Crolla and Nanda Heshof Schrama

Case-Study: Spark of Nature

Introduction

Download it here

Plant-e, Tim Crolla and Nanda Heshof Schrama

Case-Study: Spark of Nature

Case Studies

Download it here

CF, Luise Noring and Laura Ohler

WP5 Start-up and Accelerator Programme

Download it here

3.3. Event pictures


Air-Pollution
Food

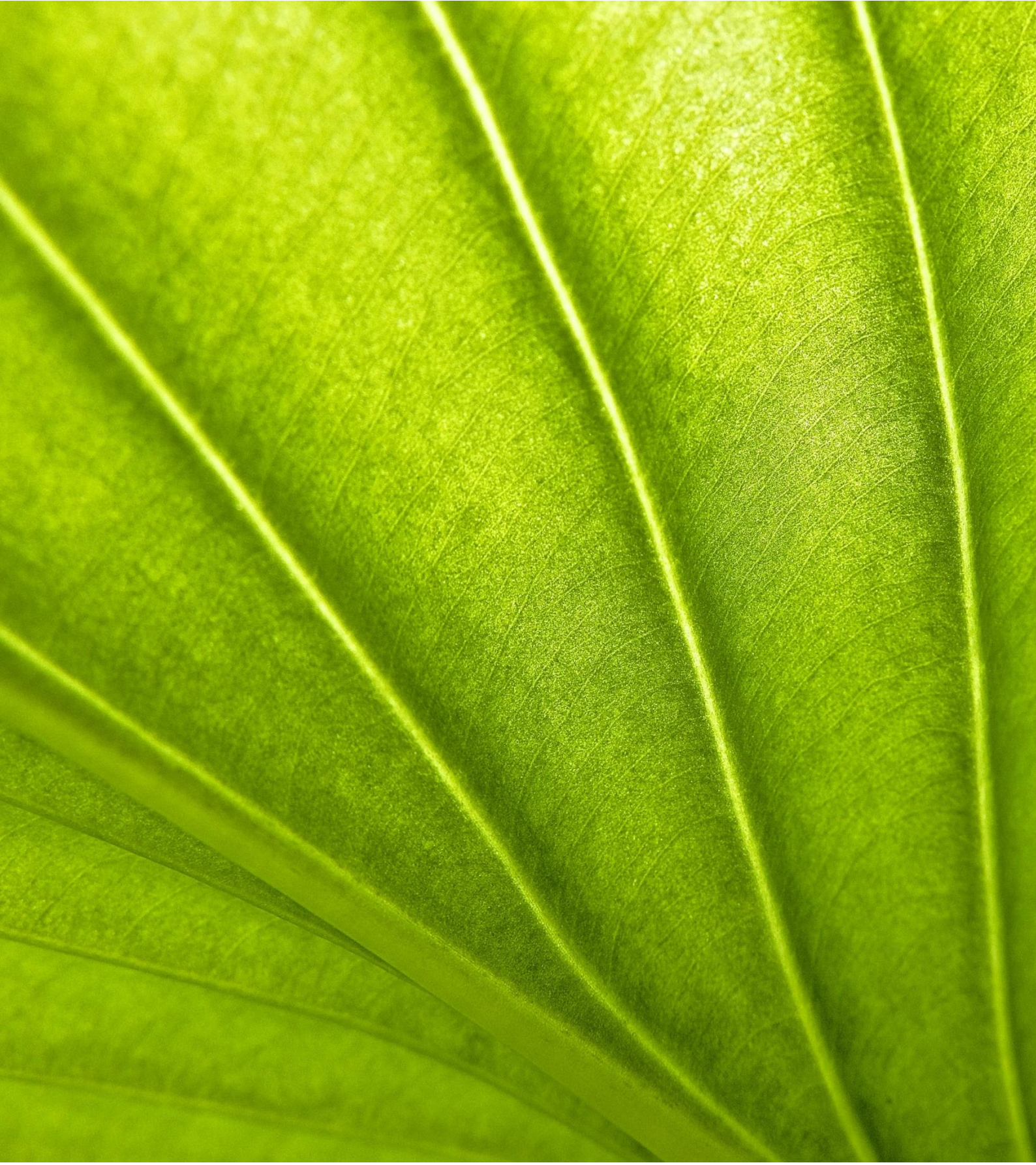
4 - CONCLUSIONS AND RECOMMENDATIONS

All participants were very satisfied with the development and outcomes of this Second Trainers Workshop led by IAAC, as it allowed trainers and SMEs experts to get familiar with design theories and concepts. It showed how living design architecture and urbanism can provide successful answers to environmental challenges in cities, by taking nature as an inspiration for the design of responsive buildings and resilient urban spaces.

The multidisciplinary collaborative setting of BUILD Solutions allows trainers to show students how the different ways of thinking in each discipline can be directed towards the same objective. And, with the necessary organizational structure, it can lead to extraordinarily exponential goals and outcomes.

After three days of exhaustive and fruitful discussions, it became clear that some terminologies are used quite differently depending on the discipline. Therefore, BUILD Solutions partners have agreed to develop a common terminology glossary with the aim of allowing a joint language to be used throughout the transdisciplinary programme. For this reason, the Living Design Trainers Workshop has served, among other things, to identify this gap as a necessary development in transdisciplinary programs.

IAAC Valldaura Labs: taking nature as an inspiration for the design of responsive buildings and resilient urban spaces!



Building Urban Intelligent Living Design Solutions, 2018-2021

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