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

BUILD SOLUTIONS

EVALUATION CONCLUSIONS FOR ONE-YEAR PROGRAMME

Work Package:	WP6
Deliverable	D6.4
Due date:	M21
Submission date:	M21
Responsible partner:	Ersilia
Version:	V0
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Deliverable type:	Report
Dissemination level:	Confidential

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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[1]. 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

[1] http://ec.europa.eu/research/eic/pdf/eic_recommendations_set-1_2017.pdf

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 – INTRODUCTION

The One-Year Programme is one of the key transversal activities of the BUILDs project. Its main objective is to develop a new innovative and multidisciplinary approach to teaching and learning to merge the fields of biology, architecture, and business with the aim of exploring and introducing to the market intelligent living solutions that address global urban challenges.

To achieve this, we have put together trainers and researchers with business specialists and coaching experts in order to develop the content, structure, and tools of the One-Year Academic Programme that aimed at being multidisciplinary, fully interconnected, and that incorporates a business mindset. On the other hand, the actual activities of the One-Year Programme have been structured using the learning-by-doing methodology where students developed their projects by testing biology concepts, fabricating prototypes, and simulating performances on the market, while being coached by trainers of the three different disciplines as well as by business specialists.

The BUILDs One-Year Programme took place during the academic year 2019-2020, where a total of 30 students (10 students from each discipline of biology, design and business) have worked together with the support of their trainers and coaching experts.

The second part of the One-Year Programme started in the second semester (Jan-Jun 2020) with the 5-Day Workshop in January.

This document firstly introduces the One-Year Programme structure, describes objectives of the evaluation, used methodology and a summary of the evaluation results that we have done to support the improvement of the one-year programme. Secondly, presents the 5-Day Workshop structure and a summary of the evaluation results from the students and trainers that reflect on achievement of key learning goals.

3 – ONE YEAR PROGRAMME STRUCTURE

The BUILDs academic year was organized as follows. During the first semester (Sep-Dec 2019), the biology and agronomy students from UL worked towards the analysis of the scientific concepts behind the current global challenges and studied how nature-based solutions (NBS) can help facing them. Besides regular interaction with their own UL trainers, three online meetings were scheduled (one per month) to give guidance and feedback to the students' research process, where trainers from the other two higher educational institutions (HEI) and disciplines (meaning from IAAC as architecture and design experts, and from WU

with the entrepreneurship expertise) participated, together with representatives of the other BUILDs business partners.

In December 2019 an all-students meeting was held online with the participation of both students and trainers from the three HEI (UL, IAAC, WU) as well as of all the project's partners. In that meeting, UL students presented their preliminary findings and introduced to their WU and IAAC peers the concepts of urban ecosystem services, ecological functions and to ecosystems services notions. They presented an exhaustive analysis of several NBS case studies, highlighting their main features, which challenges and United Nations Sustainable Development Goals they addressed, the ecological functions and the ecosystem services they provided, and the gaps they found from an ecological perspective, by ending with some suggested improvements. This served as the background basis for the continuation of the second phase of the One-Year programme when design students (from IAAC) and business students (from WU) joined at the second semester.

At the end of the semester, they participated in an online challenge that included a final pitch before a jury of established investors. One start-up will be selected by the jury and will participate in the Accelerator Programme in September 2020 in Copenhagen.

3.1 Evaluation objectives

The aim of evaluation is contributing to improve educational activities -while they are happening, as well as to provide insights to design better educational activities.

The evaluation of all educational activities will include analysis of:

- the effectiveness of the workshops/learning programme including its reach of the target audience
- the impact of the programme on students
- the skills, competencies and dispositions gained during the programmes
- the application of the knowledge and skills gained
- the strengths and weaknesses of the education approach used
- recommendations for changes to the programme so the programme may be implemented in new courses.

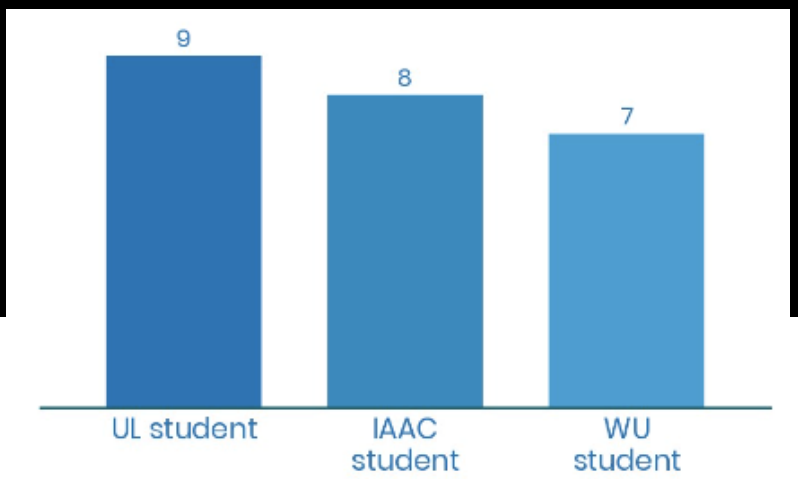
3.2 Evaluation methodology

We carried out an evaluation survey which included a mix of qualitative and quantitative feedback to evaluate the success and impact of the event.

3.3 One-Year Programme Survey results

In this chapter we present the results related to One-Year Programme. 24 students answered the survey.

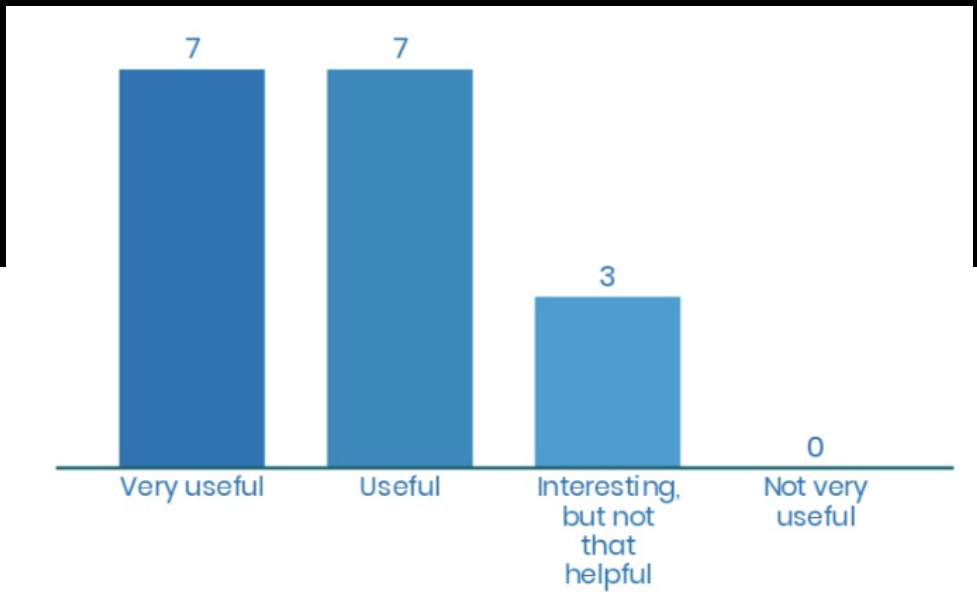
Q1 - What is your profile?



The survey answered 9 students from UL, 8 students from IAAC and 7 students from WU.

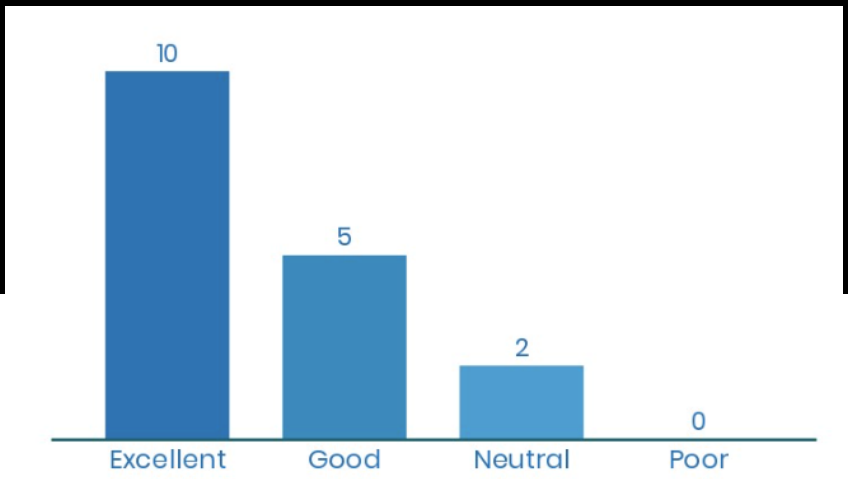
Q2 - What words come to your mind that explain, summarize or symbolize the final result of the Semester Student Programme?

Q3 - In terms of your future professional career, how useful did you find the Semester Student Programme?



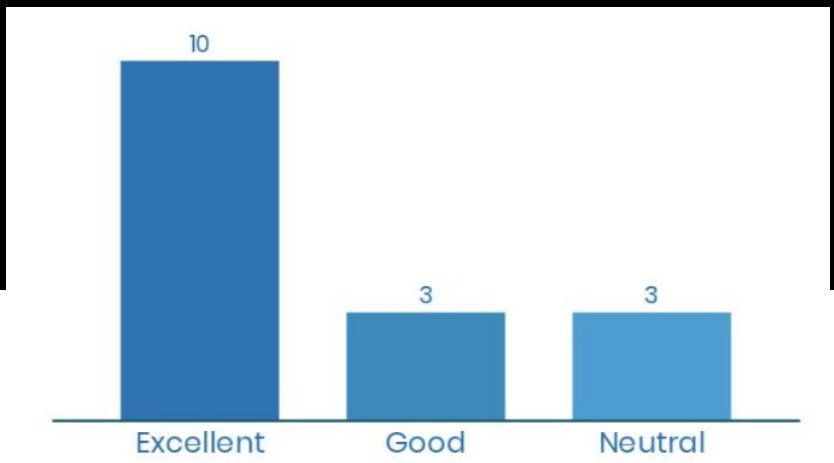
For most of the students the Semester Student Programme was very useful and useful, only for 3 students it was interesting but not that helpful.

Q4 - How would you rate the overall learning experience?



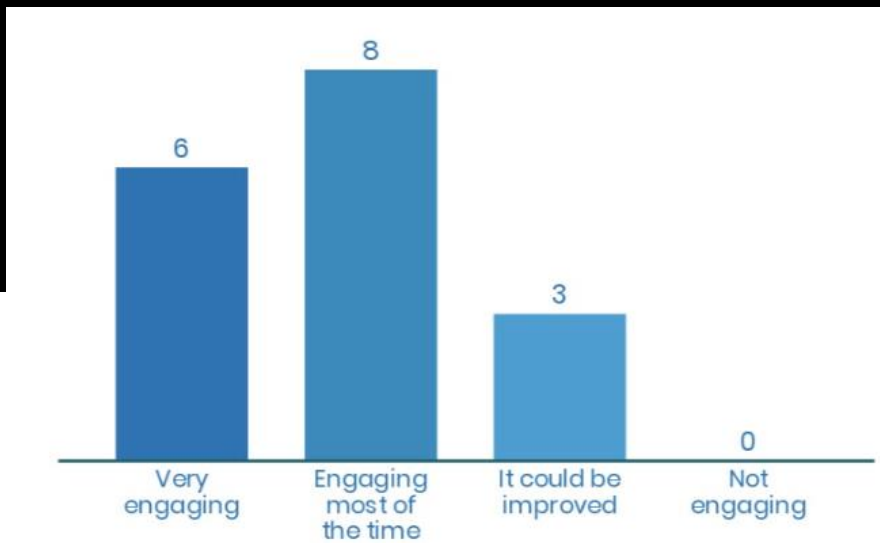
Most of the students responded positively about the overall experience, 2 students are neutral.

Q5 - Rate the quality of the content throughout the semester programme?



Most of the students rated positively the quality of the content throughout the semester programme, 3 students are neutral.

Q6 - How engaging would you say the overall content was?



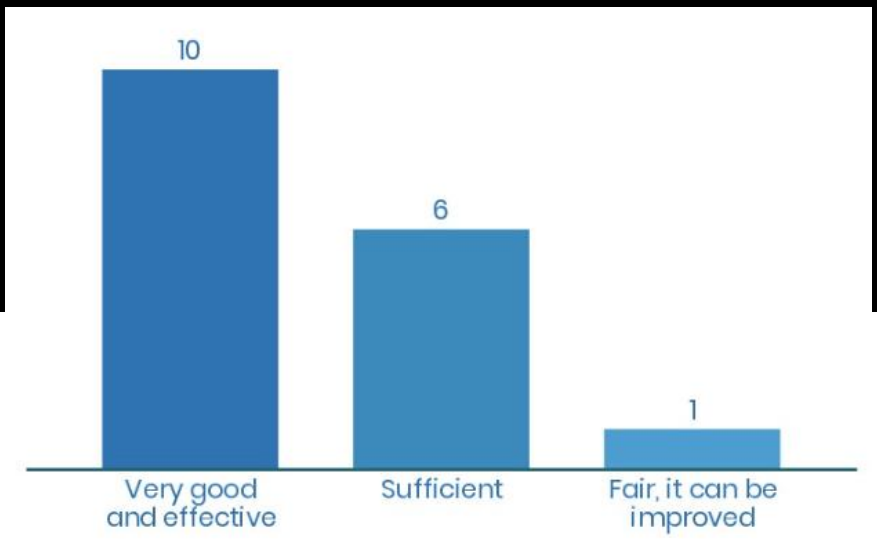
Most of the students responded that the overall content was very engaging and engaging most of the time, 3 students thing that it could be improved.

Q7 - In what part of the semester programme did you feel more engaged?

We received distinct responses to this question:

- Before the January session and during the project creation.
- During the week in Barcelona.
- First month after Barcelona.
- In working with my team. I would have hoped more lectures were part of the semester.
- During the week in Barcelona.
- Throughout the whole semester thanks to motivated team and mentors that helped us!
- The time in Barcelona was most engaging, followed by the last couple of weeks, which showed rapid growth for us.
- To grow our project as best as possible.
- Designing and Pitching.
- The 5-day workshop! And the final week before the pitch.
- I felt more engaged when we had a workshop in Barcelona with all the students. I also enjoyed more of fabrication and testing part of the product. Having a multidisciplinary team is a good strength.
- During the week in Barcelona.
- The process of learning how to work in teams from different background.
- At the end!
- Beginning.
- Creativity exercise.
- Introductory workshop.

Q8 - How would you rate your experience with the trainers?



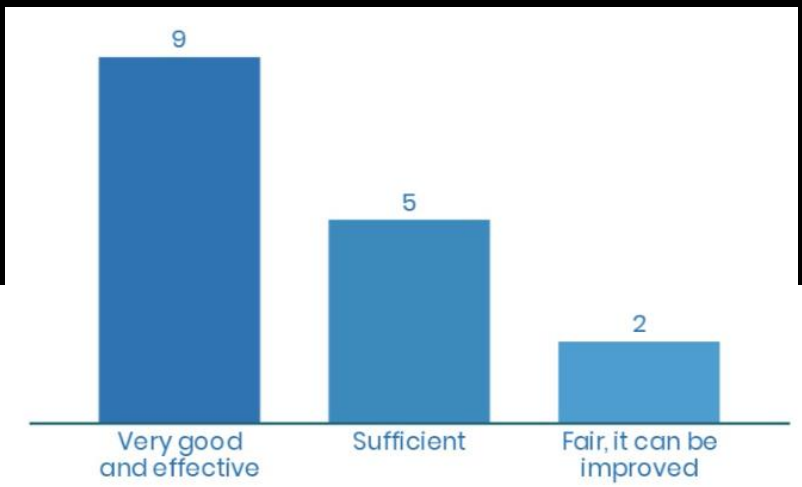
Most students rated the experience with the trainers as very good and effective, 6 students rated it as sufficient and 1 student as fair, it can be improved.

Q9 - If your reply to the previous question is fair- How should be improved or done differently?

These are the specific comments reported by students:

- Trainers should focus less on grades and pressure through course presentations and more on delivering advice and their expertise to start-ups.
- N/A
- I think so far, it was very good according to my experience. Maybe more can be discussed about the scalability and ease of doing business related to the product in the very beginning. So that we can change ideas or project before it's too late.
- More feedback from different trainers (we had often the same or our mentor). News points of view from people who didn't know our project. Get the basis of each discipline to grow such projects.
- Maybe I was expecting to learn more from the trainers from other disciplines. Maybe it would have been nice to have some classes from the others disciplines to acquire some basic knowledge.
- The groups should be formed otherwise, that student have time to work on the project, no during internships.
- More start up focus.

Q10 - In relation to mentors, how would you rate the quality of the support and input given?



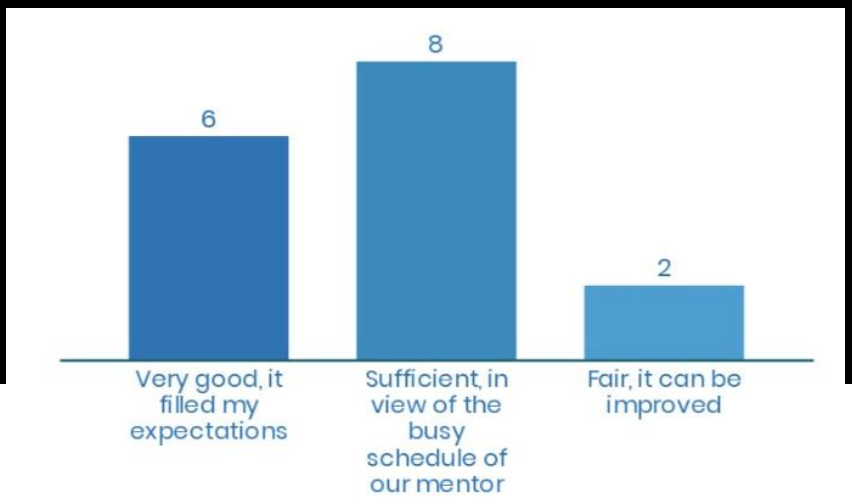
Most students rated the quality of the support and input given as very good and effective, 5 students rated it as sufficient and 2 students as fair, it can be improved.

Q11 - If your reply to the previous question is fair- How should be improved or done differently?

These are the specific comments reported by students:

- More regular input from biology.
- More tracking, like survey with 3 improvements, the next goal and the difficulty each week, moreover one bigger survey/interview with the help/idea/feedback of the mentor.
- N/A
- More meetings with the mentor and maybe more help with giving useful professional contacts.
- We would have been use some juridical advices, and maybe more “tutors times”.
- The level of support varied between the different mentors, some were very helpful and some were less helpful.
- Listen to the propositions of students when they suggest something is wrong.
- No need for improvement. Just maintaining quality is enough.
- We didn’t have many meetings with the mentors. It would have been nice to have some monthly meetings with them. But maybe the responsibility is ours because we could ask for more meetings.
- Was great.

Q12 - In relation to mentorship, how would you rate the time devoted to it?



Most students rated time devoted to mentorship as sufficient, in the view of the busy schedule of the mentor, 6 students as very good, it filled my expectations and 2 students as fair, it can be improved.

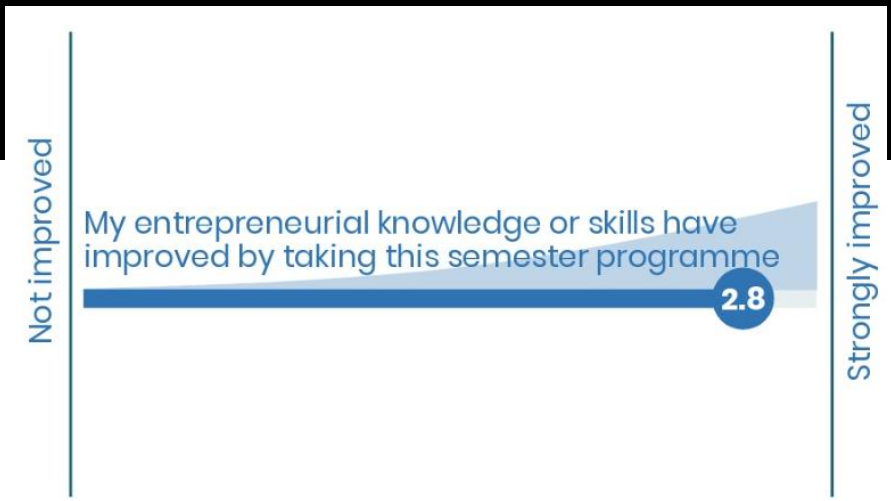
Q13 - If your reply to the previous question is fair- How should be improved or done differently?

These are the specific comments reported by students:

- It was sufficient.
- Don't know.
- More meetings would have been useful but I understand that our mentor had a very busy schedule.
- N/A
- No improvement needed.
- The mentor assigned we did not know properly how to approach regularly and or they were a bit busy.
- Good.

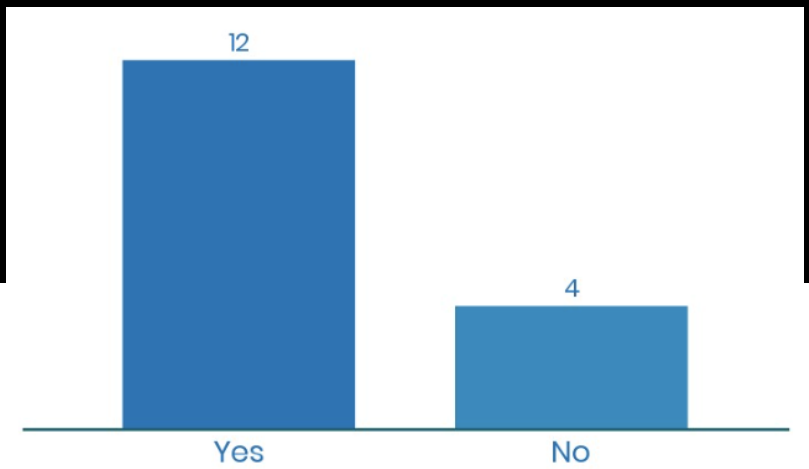
Q14 - Evaluate from 1 - Not improved to 3 - Strongly improved the following statement:

My entrepreneurial knowledge or skills have improved by taking this semester programme



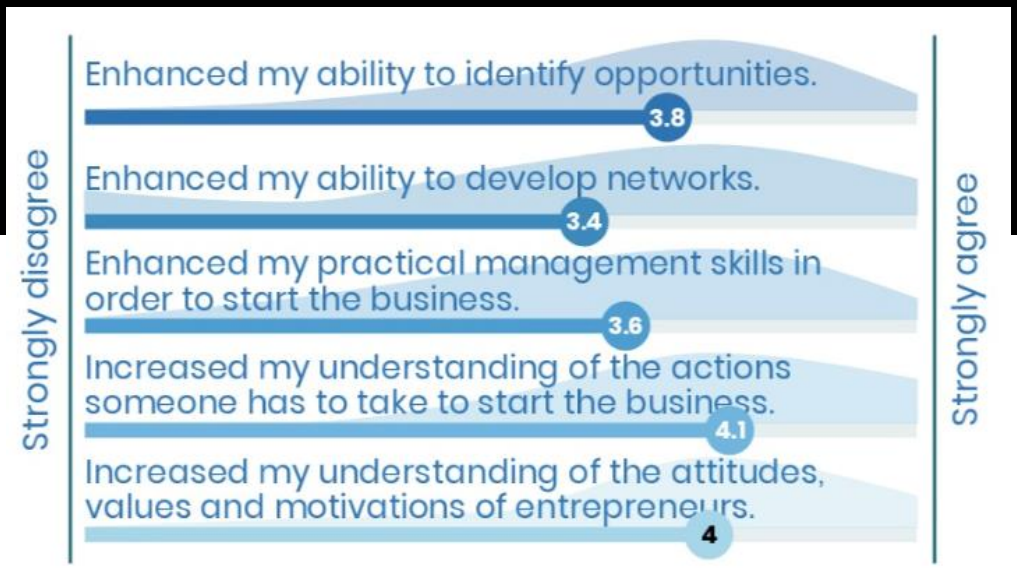
For most student's entrepreneurial knowledge or skills have strongly improved by taking this semester programme.

Q15 - Would you consider further training on this topic on your own?



Most of the students would consider further training on this topic on their own, 4 students would not consider it.

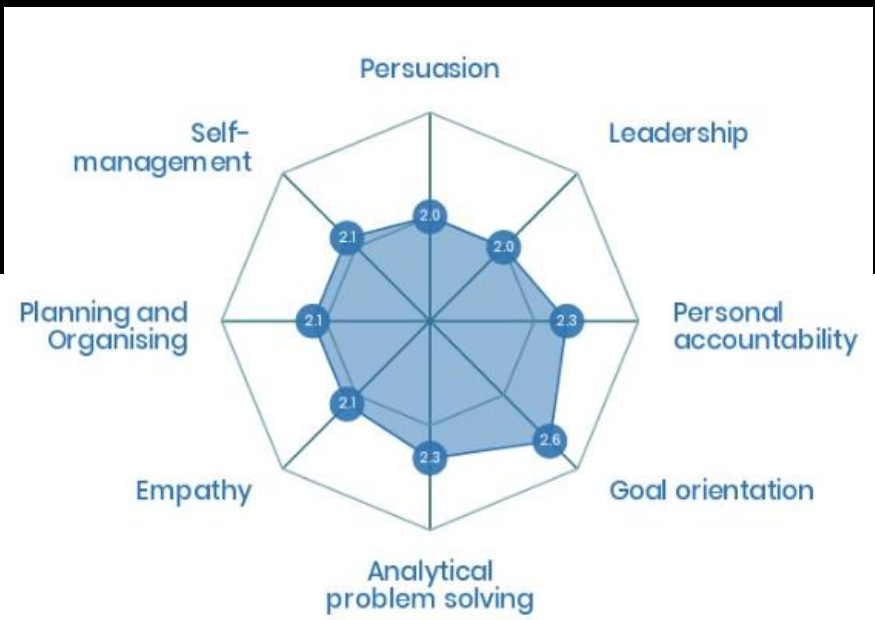
Q16 - Indicate your level of agreement to the following statements (1 - Strongly disagree to 5 - Strongly agree). The semester programme I attended:



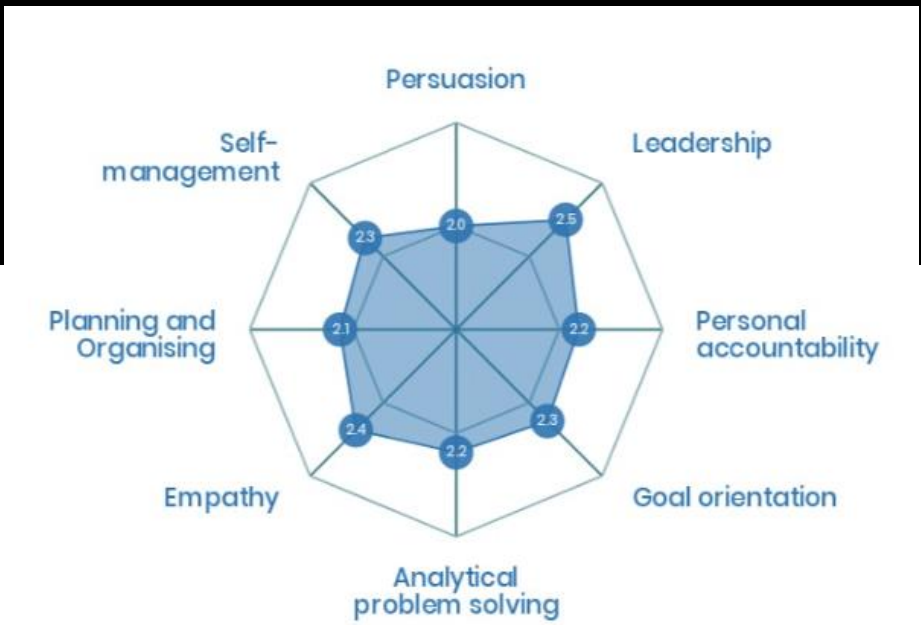
Q17 - – Indicate your level of agreement to the following statement (1 - Strongly disagree to 5 - Strongly agree):

Most of the students have strong intention to start a firm someday.

Q18 - Rate the entrepreneurial skills you acquired or improved during the program (1 – Low to 3 - High):



Q19 - Rate your group in terms of the entrepreneurial skills below (1 – Low to 3 - High):



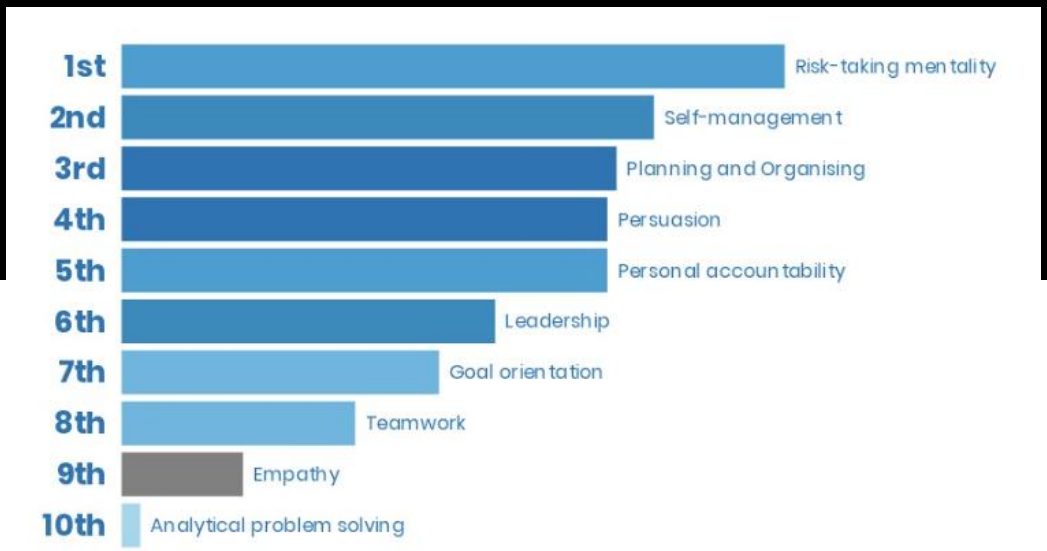
Q20 - How would you describe your team progress during the semester programme?

These are the specific comments reported by students:

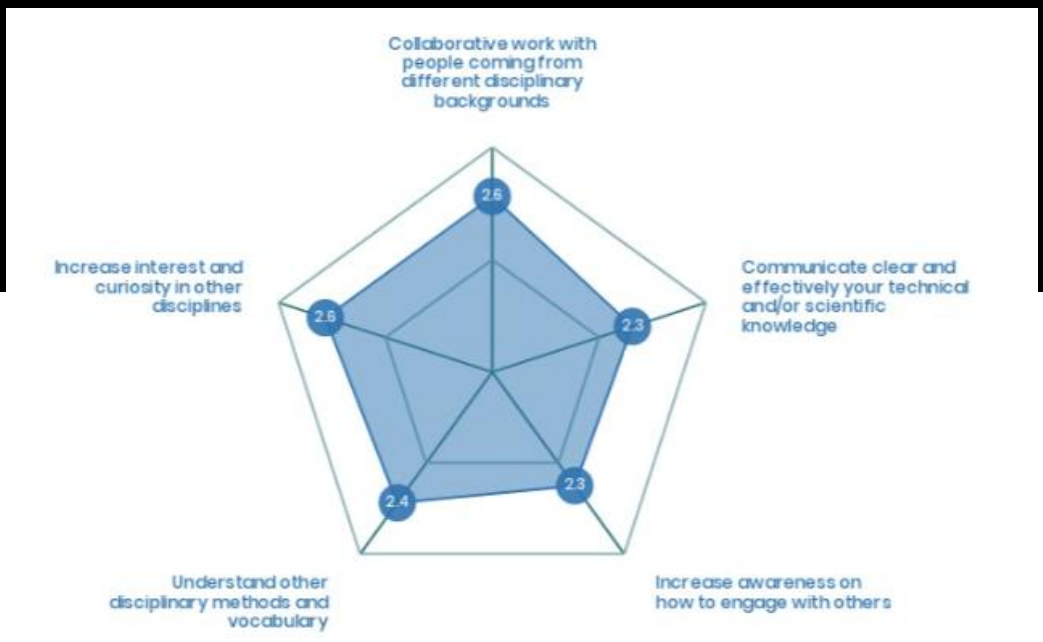
- Good progress especially in business and architecture.
- A long journey with personal growth but different motivations intrinsic if there was no course attached, extrinsic if grades had to be delivered.
- Good.
- Very fast in Barcelona, a bit slower in the middle of the program, especially since many members of the team relocated, very fast growth at the end of the program.
- An amazingly strong and growing relationship, lots of empathy towards the team, listening/understanding, sharing everything clearly to work perfectly in adequacy. Use of specialized skills of each one, learning from each part. Improve step by step.
- At the beginning we've struggled with the main idea for the start-up, however during the last 2 months the progress was huge.
- Great progress and also o lot of directions we abandoned to follow new paths.
- We came to develop an idea according to the costumers needs.
- I personally feel that the engagement level for everyone was different and this could be seen in the product I would have loved it if everyone had the same level of engagement.
- Quite promising! Even though with a slow start.
- My teams experience has been very good. We constantly kept in touch every month. We worked in our respective expertise and combined all our skills and knowledge effectively.
- Meaningful.
- A very good progress has been made during the semester, very interesting to see how the team all worked together.
- We have huge evolution.
- Difficult because not the same involvement.

- It was quick for a group of person who didn't know each other before the semester. It went easier than expected to work with people who are in different countries.

Q21 - Among the entrepreneurial skills below which ones you feel need more specific training?

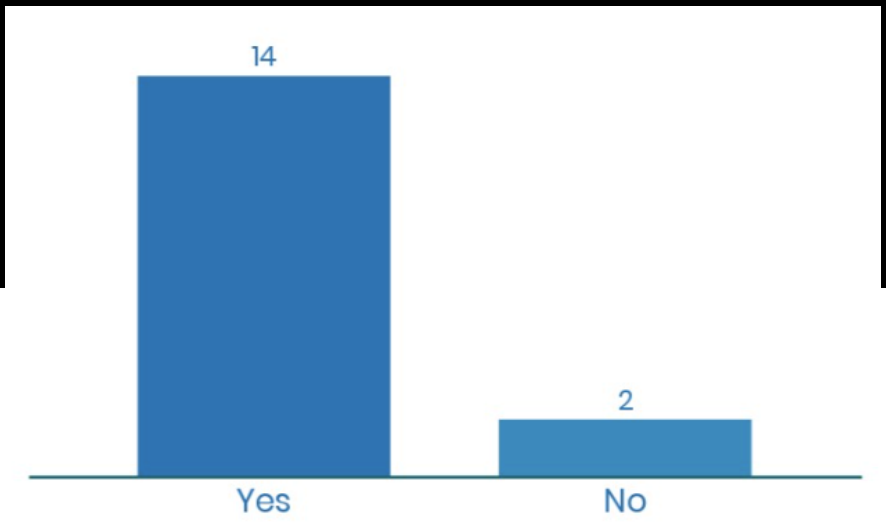


Q22 - Rate yourself in terms of the interdisciplinary skills you gain during the semester programme (1 – Low to 3 - High):



Q23 - Indicate from 1 - Not ready to 3 - I feel ready: How ready do you feel to bring biotechnology & architectural design solutions to the market?

Q24 - Would you recommend this programme to other students?



Most of the students would recommend this programme to other students, only 2 would not recommend it.

Q25 - If your previous answer is no, please reply why?

These are the specific comments reported by students:

- It was not well organized for UL student to work on this program and on the internship: it has been a source of stress for me.
- I recommend this program.
- Because we started a long time before the others students without many goals- the program was supposed to stop earlier but finally it encroached on our internship period, so it became difficult to conciliate both – BUT it was a great opportunity.
- N/A

Q26 - Did the COVID-19 Pandemic have an impact on your work for the BUILD Solutions project? If yes please explain why/how.

These are the specific comments reported by students:

- Yes in terms of prototyping.
- Yes, I let me lots of time to work on.
- No, we worked remotely before the pandemic started, it actually gave us more time to work on the project.
- Yes, many of our team members relocated, some to different time zones, and some of our pilot projects got cancelled due to the virus.
- Yes, our architects and not in Barcelona anymore, so they can't build the prototype in order to test it.
- Yes. We could not prototype.
- A bit negative impact on our motivation but we were still able to work efficiently (we were used to working remotely).
- Not really.
- No not at all. Except for the final prototyping.
- Not really. We were already working remotely together anyway.
- Yes for the 3D printing.
- No.
- I don't think so, maybe it was more difficult to find motivation during the quarantine but it was something general, not only Builds.

- It did have an impact. But a positive one. Platforms like zoom made it easy to keep up the communication. Fabrication and testing became a challenge due to the lockdown.
- Harder to contact potential clients.

Q27 - Could you suggest any improvements?

These are the specific comments reported by students:

- More meeting in person with the team is important.
- Do not grade the course.
- It would be great to connect with the student from IT field as well.
- Maybe some more connections to lawyers – e.g. corporate lawyers, not just IP attorneys & possibly organize a sales workshop.
- And stop our experiments for the next questions. A better schedule and objectives clearer, a final pitch conduct clearer.
- Ensure the level of engagement for all members is the same within all three domains.
- More help from mentors, and feedback from investors.
- Take more in account the personality of each student to create a groups, the idea is important of course, but if the team don't fit, then is worthless.
- Have the same involvement among students previously defined, time investment too big for the result, and no start-ups start with 6 people, 2 or 3 is the maximum that is possible to grow a start-up.
- No more comments. Keep up the good work.
- No one should have grades from this program.
- More communication since the beginning of the project to enable everyone to really know what they are getting into.

Q28 - Any overall comments, feedback, or suggestions?

These are the specific comments reported by students:

- Overall a good opportunity but definitely room for improvement.
- THAAAAANK YOU VEEEEERRRYYYY MUUUUUUUUCHHHHH, it was a simply amazing and I'm very proud of this experience.
- I enjoyed the whole experience and am looking forward to set up our own firm.
- It would be really really sad if this program would not exist for further generations – I can't express how much this helped us to build our own start-up!
- This project was really interesting in human matters and interdisciplinary work, it is important to take all the part of the field to work together in order to create better cities. Maybe take more time between them to really understand each other.
- More programmes like these should be done!
- THANK YOU VERY MUCH!!!
- It was a pleasure to be a part of such amazing initiative, I hope that the program will continue to give a chance to other students to develop their ideas.
- Listen more to suggestions from students but also from trainers, they were not very much listened for the group formation for instance.
- No. Maybe the feedback form is too large. It doesn't end □
- It would have been nice to know in what criteria the final jury based their decision for the best pitch.

4 – 5-DAY WORKSHOP STRUCTURE

The second part of the One-Year Programme started in the second semester (Jan-Jun 2020) with the 5-Day Workshop in January.

The five day workshop encouraged students to work on biological research with the aim of applying it in urban areas, eventually building a prototype of an urban living element. It took place on the 13th through the 17th of January in Barcelona, Spain. The workshop was organized and developed by the Institute for Advanced Architecture of Catalonia, Université de Lorraine, Vienna University of Economics and Business, ERSILIA Foundation, ECONICK, Plant-e, City Facilitators, BloxHub, and GreenTech Challenge.

In the 5-Day Intensive Workshop, 10 students from each HEI, their trainers, and SMEs experts gathered during five days at IAAC (Barcelona), being the first meeting students had face-to-face. It was a really action-oriented learning experience, where students met, formed groups, and ideated new products and services combining intelligent living design, biotech, and business solutions to help green cities. Five start-up teams were formed (Epiclay, PlayJungle, Worm Generation, aeroSQAIR, and C:aire) and each one was composed by 6 members - formed by 2 students of each HEI. From there, they have been actively working remotely in their projects throughout the second semester.

4.1 Detailed 5-Day Workshop Programme

DAY 0	Sunday January 12th
20:00	Team building and dinner

Day 1	Monday January 13th – Intro to BUILD Solutions
09:00 - 09:15	Welcome remarks and Introduction to the Project [IAAC]
09:20 - 09:30	Presentation of the objectives of the week [GTC] a) Sellable pretotype b) Market entry plan including examples of use of city spaces c) Tech specs (bio and city) needed d) Investor pitch deck e) Video diary
09:30 - 09:50	Visit around IAAC installations [IAAC]
09:50 - 10:30	Students discussion: UL brief summary of December presentation + IAAC and WU feedback with ideas to set up a project
10:30 - 11:00	Basic Lecture by Plant-e and Econick
11:00 - 11:10	Coffee Break
11:10 - 12:30	Team Building [WU]
13:00 - 14:00	Lunch Break
14:00 - 17:30	Exploration of 3 hubspots 1. Biology: Ciutadella Park 2. Architecture: Super Illa 3. Business: WeWork//BCN tech hub
19:00	Students social gathering

Day 2 – Tuesday January 14th – Groups + Exploration and Beginning of Pressure	
09:00 - 09:30	Inspiration Lecture on team building [GTC]
09:30 - 11:00	Tasks on Group Formation [WU]
10:50 - 11:00	Coffee Break

11:00 - 12:30	1- Brainstorming - divergent - 5 solutions proposal – check if the solutions are already on the market [GTC]
12:30 - 13:30	Lunch break
13:30 - 14:50	Convergence on the concept + group consolidation - 1 or 2 solutions (biology concept/design first idea/business concept) [GTC]
14:50 - 15:50	Team Building (fun competition) [WU]
15:50 - 16:00	Coffee Break
16:00 - 17:00	Presentation of solutions - critical questions - pass-fail hypotheses
17:00 - 17:30	Presentation by City Facilitators on the accelerator programme
17:45	Challenge: Interview end users/customers before arriving at IAAC at 9 am the next morning

Day 3 – Wednesday January 15th – High Pressure Day [Main Lead: GTC]

09:00 - 09:15	Analysing the data from the interviews
09:20 - 09:40	Inspiration Lecture [Christian Rammel: WU]
09:40 - 10:00	Task of the day. Deliverables: • Biology: Viability (risk assessment) • Design: Pretotype fabrication • Business: Business plan (SWOT and Viability; playing to win)
10:00 - 10:10	Coffee Break
10:10 - 17:00	Deliverables production • sellable pretotype (sketch) (Design and Business) [check for time slots] • market entry plan including examples of use of city spaces (Design and Biology) • tech specs needed (hypotheses to be tested) (Design + Business + Biology) • Investor pitch deck (Design + Business + Biology) - max 3 minutes. Picture heavy, text light. • Video dairy (3 days)
17:00 - 17:30	Online Delivery (and physical pretotype, if any)
19:00	Social Spy Game: Meet for drinks and dinner, get to know all the other start-ups to explain them the day after

Day 4 – Thursday January 16th – Self-Management + Celebration [Main Lead: GTC]

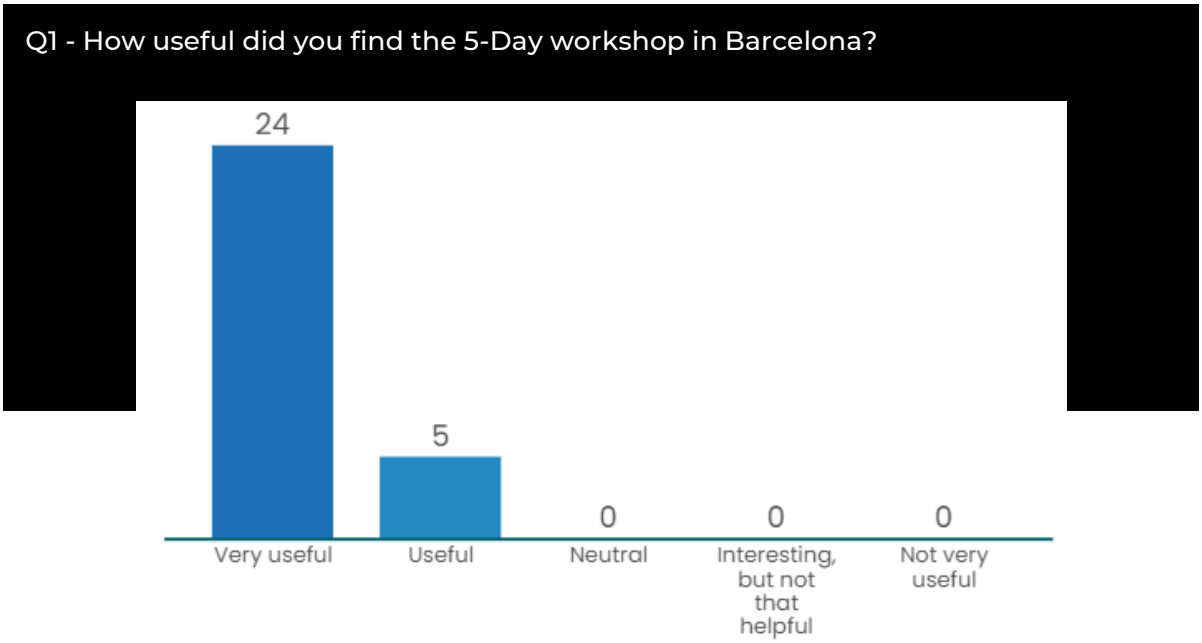
9:00 - 10:30	1 time slot of 30 min for each group [GTC]: • Presentation of solutions (20 min) • Critical questions (10 min per group) both coaches and change makers • Share learnings • Iteration on presentations for Jury
10:30 - 10:40	Coffee Break
10:40 - 18:00	Work work work [GTC]: each group has one mentor
18:00 - 18:50	Jury Delivery
19:00	Dinner + Celebration

Day 5 – Friday January 17th – Decompression and Next Steps

08:45 - 10:30	Final presentation with critical external feedback (15´ pitch presentation including questions and feedback)
10:30 - 11:15	Remote Management Revised Next Steps (with fixed dates and locations)
11:15 - 12:00	Closing Session (evaluation)
12:00	End

4.2 5-Day Workshop Survey results from students

In this chapter we present the results from students related to 5-Day Workshop. 29 students answered the survey.

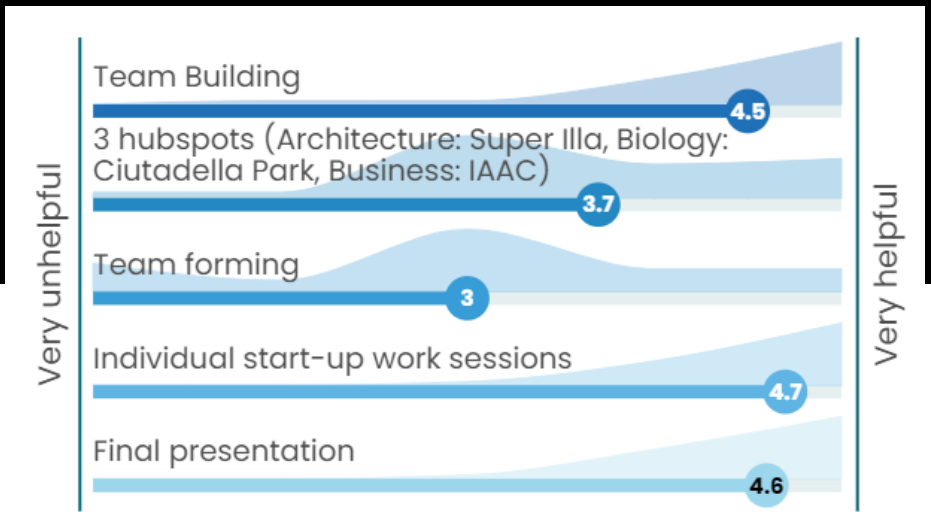


Most students responded that the 5-day workshop was very useful. Only 5 participants said the workshop was useful.

Q2 – What words come to your mind that explain, summarize, and symbolize the final results of the 5-Day Workshop?

These were the presented words that participants noted after hearing the final projects.

Q3 – Evaluate from 1-5 the activities from the last 5 days: (Unhelpful being 1, helpful being 5)

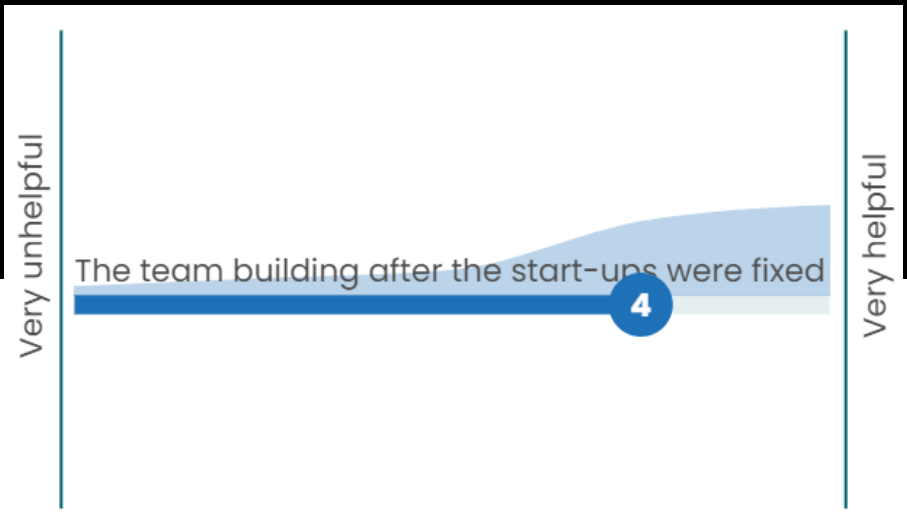


Most students rated the group activities as helpful, with all the activities team building, final presentation, and individual start-up work sessions earning a mean above 4.5/5. The group formation, scored below that with an average of 3/5.

Q4 – Evaluate from 1-3 the team building before the group consolidation: (Unhelpful being 1, helpful being 5)

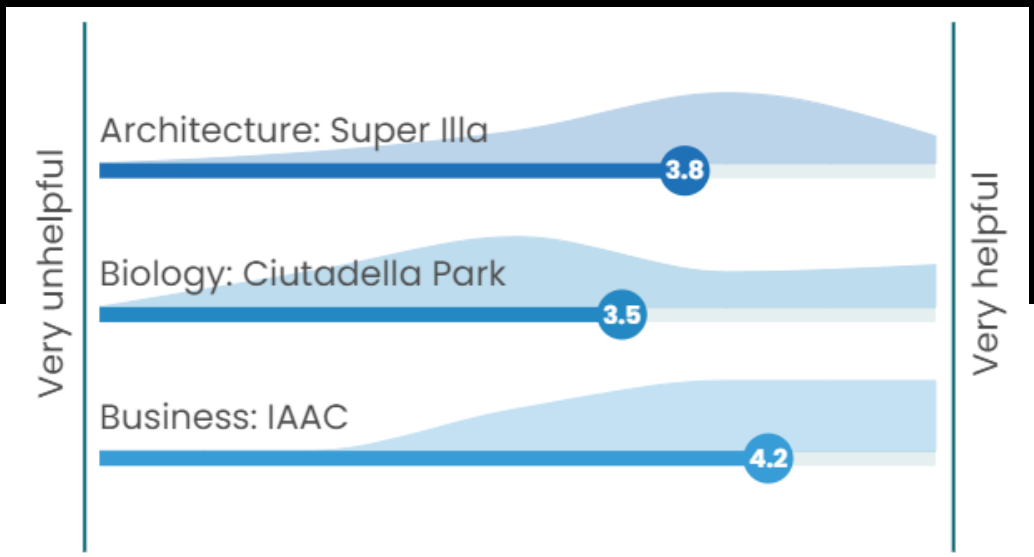
Most students rated the team building prior to group consolidation as helpful.

Q5 -- Evaluate from 1-5 the team building after the start-ups were fixed: (Unhelpful being 1, helpful being 5)



Most students found the team building after group consolidation helpful.

Q6 – Evaluate from 1-5 the following hubspots: (Unhelpful being 1, helpful being 5)



The business hubspot was found to be the most helpful, whereas the biology hubspot was found to be the least helpful.

Q7 – Any other comments about the 3 hubspots?

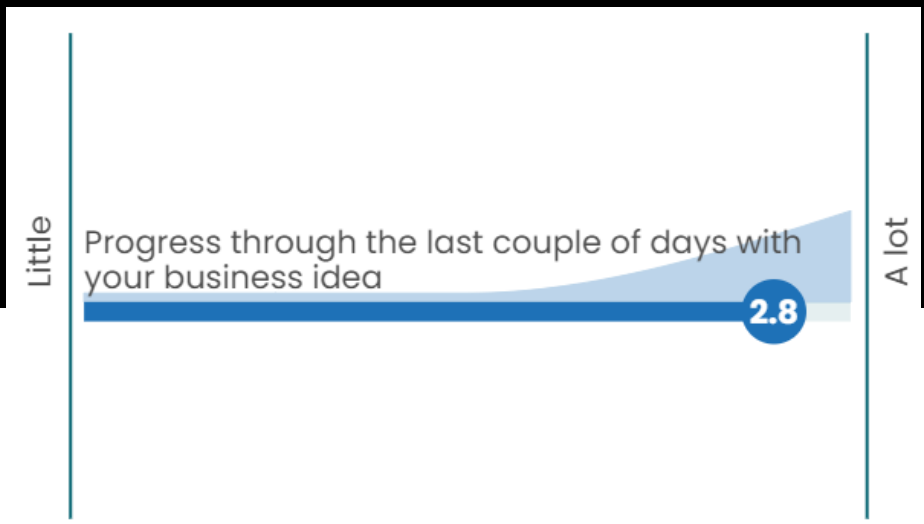
Specific comments reported by the students:

- Not really
- Could have spent more time going around
- The architecture spot should also include a living system rather than just a responsive mechanical system
- I was disappointed by how the final teams have been made. We only had 10 seconds to choose a theme while we should have had more. I feel like all the team building sessions was useful and we all have great ideas
- It would be more fun if the architecture and biology domains were as interactive with the students as the business one
- I think all the hubspots were great and beyond my expectations
- The 3 hubspots were very well chosen. If we had more time it would have been helpful to visit other places as well
- Some of the activities didn´t seem to be as well connected with the course development nor upcoming projects
- More explanations about the different projects inside the Media TIC
- It was great to get some insights into the three disciplines
- It was nice to get out, but medium helpful

- Biological part: As a biological student, not very helpful but it would be for the others. Architect part: something completely new/interesting but not enough pertinent with our purpose. Economic part: Interesting/funny but missing a summary to remind
- Like to wonder into the city for the hubspots
- We didn´t really learn a lot during these hubspots. I took them more as a team building exercise.

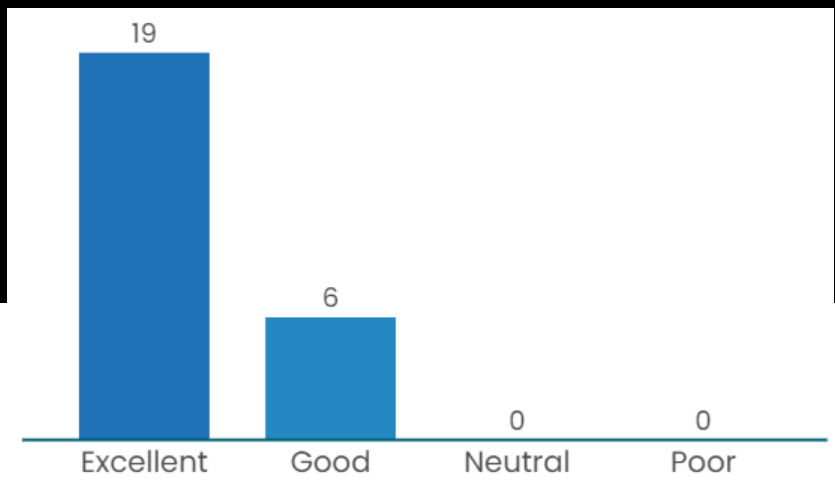
The feedback is very mixed. Some students thought the hubspots were great, but a lot reported back that they didn´t feel that the hubspot was as well connected to the project as it could have been or that they didn´t learn much. However, many of the students enjoyed getting out in the city and exploring.

Q8 – Evaluate from 1-3 your business idea progress: (Little being 1, a lot being 3)



The general consensus is yes, a lot of progress was made the last couple of days with the students' business idea.

Q9 – How would you rate the overall experience?



The majority of students rated their experience as excellent, with only 6 rating their experience as good.

Q10 – Could you suggest us any improvement?

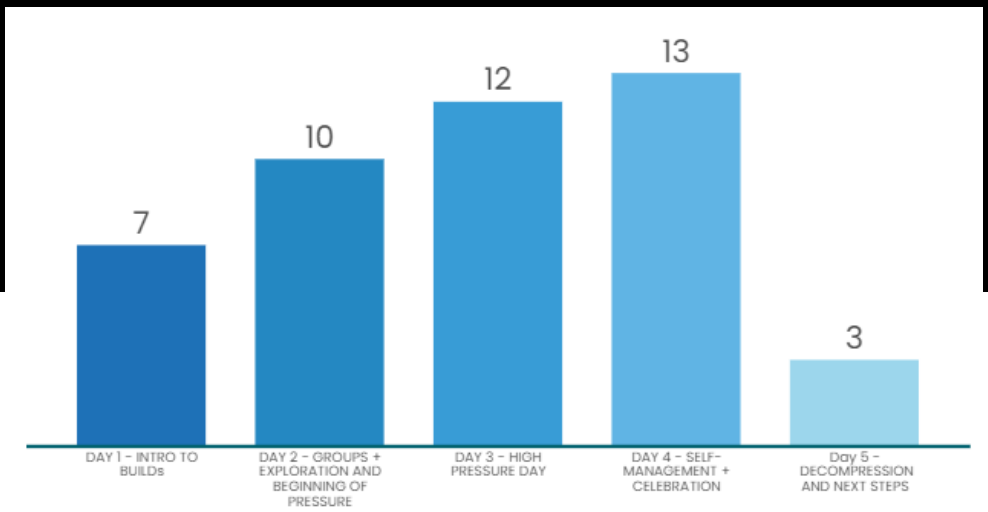
Suggestions from the students included:

- More time for ideation
- Allow students to give feedback on final presentations as well
- Starting a little later and having a little more insight on the problems prior to the workshop (doing research)
- Better organization
- Less team building sessions before making teams and more after. Also, more time to think of what the group will work on
- Could have cut down some parts and reduced hours at college to have more outdoor informative tours
- Group forming and idea finalizing could be better
- More time should´ve been spent getting to know each other´s interests before the teams were picked and solidified
- More organization as the different organizers were often undecided or would contradict one another. Some of the initial activities were either too long or irrelevant. We made teams three different times for different activities
- Students should be informed earlier that they can change their prototype if they are not happy and convinced fully. We were only informed at the end of the workshop that we can scrap and restart a new idea
- Give a little more time to decide in which area to work on: expert talk about opportunities we didn´t see se far

- Not really, I found everything really nice
- More expert input at the beginning (or even before the kick-off week) regarding 1) most urgent sustainability challenges in cities and 2) promising new technology/materials that could be used
- Leave much more time for group forming and creativity sessions (reflexion about the ideas and problems in cities that we need to solve with our future NBS)
- For me, the team formation was not the way I thought and was very random. Maybe for next time, the team formation could be done in another manner.
- Doing a bit less team building to have more time to find different innovations. Have a better organization (for the bar for example). Have a time after the day work to break (1 hour of a break before going outside). More feedback from teachers
- More time and input from the specialist from WU to create the groups. Instead of the hubspots on Monday, have a presentation on the different subjects we could build our start-up around: air, water, soil quality, etc.
- More input of how to go on with the start-ups
- The group formation was a little chaotic, we didn´t have a clear idea about the start-up concepts of others. Maybe we should start forming groups before coming to Barcelona
- The team formation could have been better explained in the beginning. I ended up in a group of people who I hoped I wouldn´t work with
- Group formation should be based on relationships, not on a subject that can change

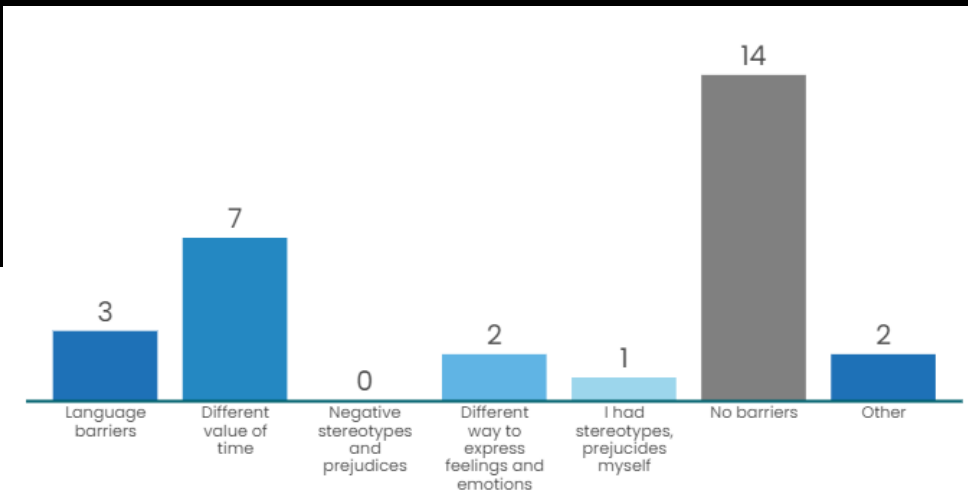
The general suggestions from the students include improving the group formation process, as many students were unhappy by how random it seemed. Many of the students also wishes there was better organization as the organizers would contradict each other. A lot of students wished for more information from the experts to help guide them.

Q11 – Which day did you enjoy the most?



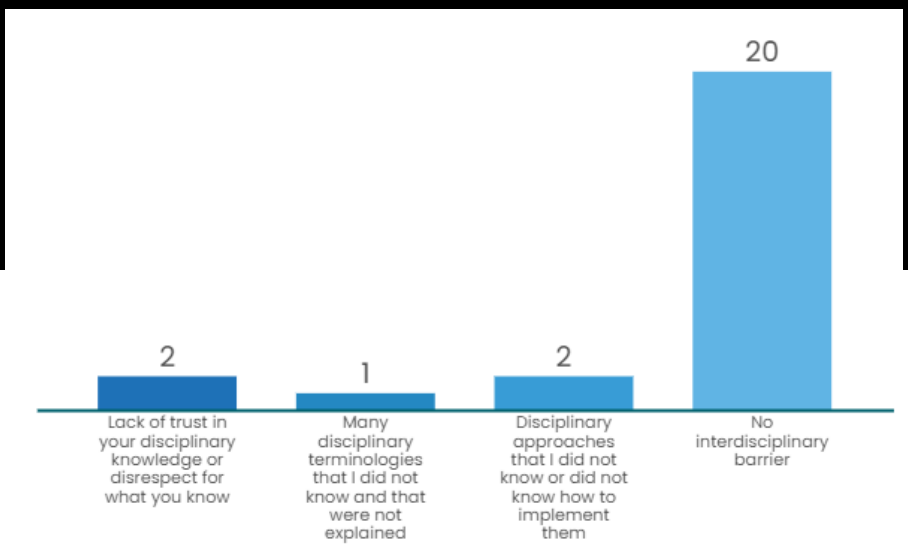
The students enjoyed day 3 and 4 the most (12 and 13 students, respectively) and enjoyed the final day the least (only 3 students chose this day).

Q12 – Did you face any of the following intercultural barriers in 5-day workshop in Barcelona?



The majority of students said they didn´t face any barriers, however the most common barrier faced was different value of time with 7 students reporting this.

Q13 – Did you face any of the following interdisciplinary barriers in 5 days workshop in Barcelona?



The majority of the students reported back no interdisciplinary barriers, however 2 students reported back a lack of trust in their disciplinary knowledge or disrespect for what they know, and 2 students reported back disciplinary approaches that I did not know or did not know how to implement them.

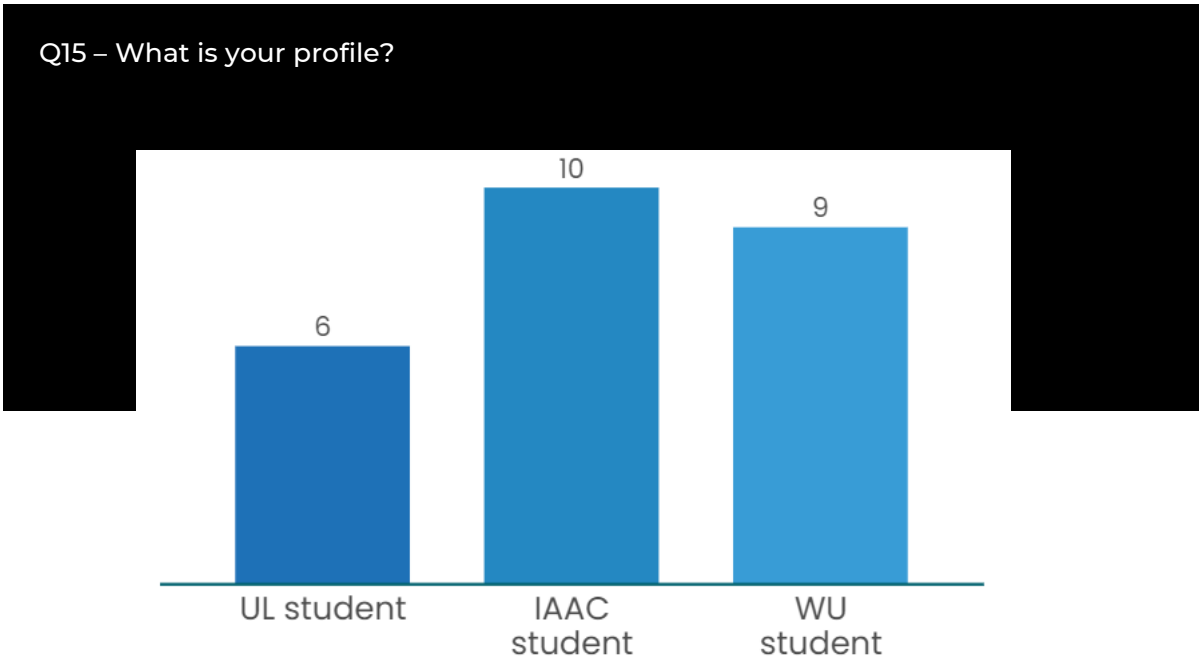
Q14 – Any overall comments, feedback, or suggestions?

Feedback from the students includes:

- Could have been less intense
- Was an amazing experience, knowing and learning from a different perspective and on a personal level it is always good to know people from different countries because they always have a different point of view from your own
- The whole session was amazing. We need more feedback from the mentors
- Very impressed with the structure of the workshop, it felt like a professional workshop that I would have paid for. Only feedback is to understand each other´s interests in the program before forming groups
- Overall experience was really great. The same group building exercises should be implemented in MAA01 as most of their projects are in groups
- It was a really good experience that allowed all of the disciplines to learn from one another. However, due to feedback or other reasons, all projects ended up being the same and with typical IAAC materials (algae mycelium biochair)
- I loved recommending to go to bars with others. The ambiance from the beginning to the end (team buildings) made it easy to be intensive and efficient. I liked the availability of the teachers, working with other disciplines/visions, and the motivation for the future

- Thank you so much for organizing a great hard-work-but-incredibly-fun week!
- The group formation should change
- Overall a really motivating experience, but a lot of room for improvement
- I enjoyed the program a lot! Just wish the group formation went a bit better for me so I could enjoy working with people as well

The student's feedback included that it was difficult but worth their effort, that they wanted more feedback along the way, and that the group formation should include knowing each other's interests.



At the end of the 5-Day Workshop, some of the students highlighted the following:

Chris - WU Student: *"I've had a lot of fun, met a lot of great, great people. I think the best thing about it was the huge progress we've made in one week. I did not see that coming, it was very fast, very efficient. I'm very proud of the progress we have made, and very much looking forward to work on the project with my team now."*

Harsh - IAAC Student: *"I really enjoyed it and liked it. I wasn't really expecting us to gel so much and I feel like I've known these people for way more than five days and we have a good team, a good project, and we have a possible future company and even if we don't get chosen for winning I actually think we're still good enough to take it forward with other investors."*

Sophia - WU Student: *"I met a lot of inspiring people, we got a lot of network contacts as well, and I think we established a great project that has potential to develop into just about anything."*

Mary-Eve - UL Student: *"I really loved it through and through and it's funny to work finally with some other people because us biologist are all in our little corner and doing our things by ourselves, but [now] we are really experimenting with others and that's the greatest thing of this program I think. And also the fact that it moved very quickly and now we all have our finished products that are working is a really good thing to see."*

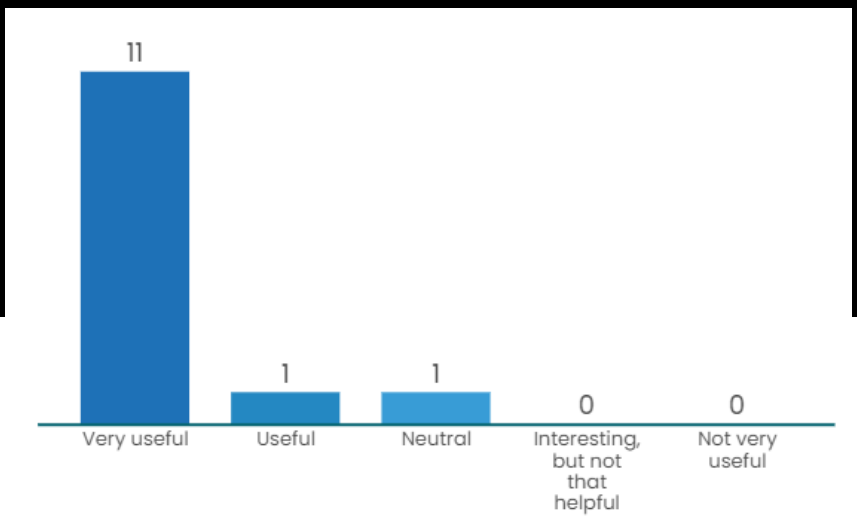
Jasmo - WU Student: *"I think it's a great program, full of different activities, full of learning, full of new friendships. I think it was a really great and successful project and I'm looking forward to the future and to where it leads us."*

Saurabh - IAAC Student: *"I really like this course it's a collaboration between three colleges which is the best part of it, we get to know other people from other backgrounds and get to work with them. Also the way the whole thing was organized very smoothly and the way we were working together through all the team building exercises and the group support was also really nice and helpful for us to come up with the project. I think with all the criticisms and all the feedbacks which we got from our mentors who were also very helpful and great in every way were really nice."*

4.3 5-Day Workshop Survey results from trainers

In this chapter we present the results from trainers related to 5-Day Workshop. 13 trainers answered the survey.

Q1 - How useful did you find the 5-Day Workshop in Barcelona?

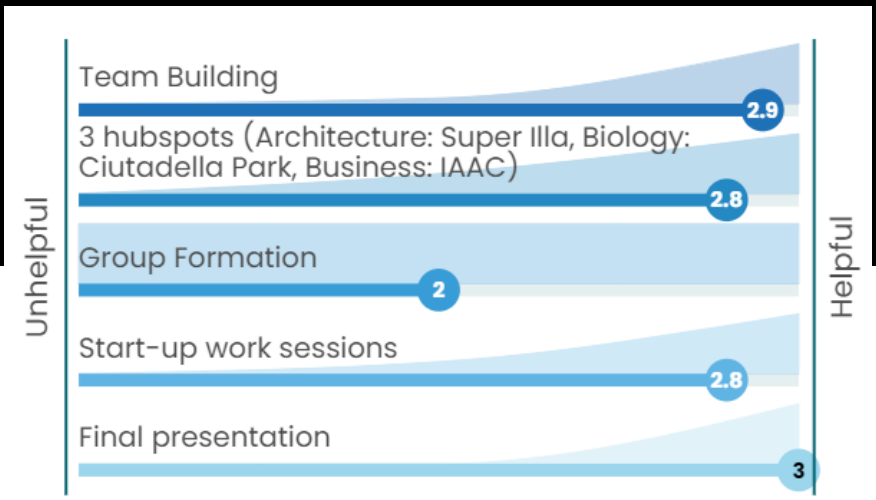


Most participants responded that the 5-day workshop was very useful. Only 1 participant is useful and 1 of them think that it was simply neutral.

Q2 – What words come to your mind that explain, summarize, and symbolize the final results of the 5-Day Workshop?

These were the presented words that participants noted after hearing the final projects.

Q3 – Evaluate from 1-3 the activities from the last 5 days: (Unhelpful being 1, helpful being 3)



Most participants rated the group activities as helpful, with all the activities earning a mean above 2.8/3. Only one activity, group formation, scored below, with an average of 2/3.

Q4 – Evaluate from 1-3 the team building before the group consolidation: (Unhelpful being 1, helpful being 3)

Most participants rated the team building prior to group consolidation as helpful.

Q5 -– Evaluate from 1-3 the team building after the start-ups were fixed: (Unhelpful being 1, helpful being 3)

Most participants found the team building after group consolidation helpful.

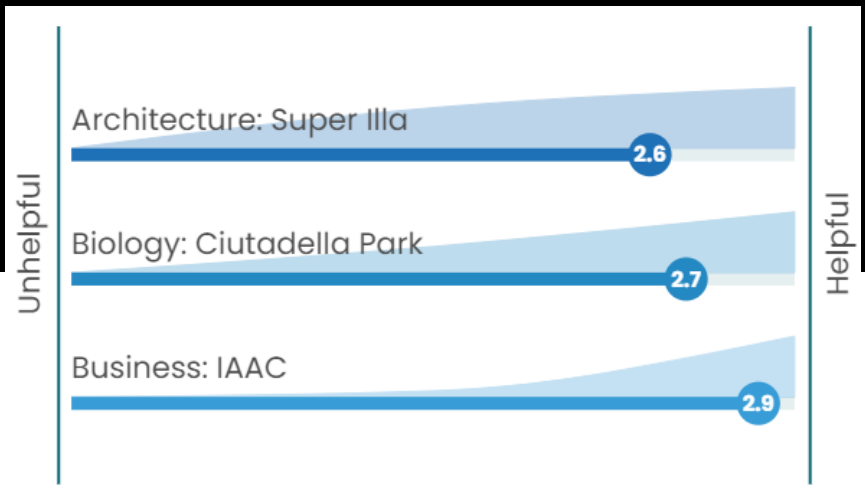
Q6 - Any comments or suggestions about team building activities?

Specific comments reported by the trainers:

- I think it went well, maybe the choice of topics could be more studied
- It would have been great to have had more time for team building after the start-ups were fixed, but given the time we had in general, I think we managed well
- I have the feeling that team building activities were especially useful after the formation of the group and that we may have spent too much time on it before that
- It was great!
- I cannot comment on the other hubspots, as I was holding one
- Some students felt that after the very positive team building, the group formation was sort of random
- We move the team-building activities to after group formation. We structure more of the problem/solution phase so students can choose earlier and start the team-building processes earlier

One of the major themes of these comments is the amount of team building that went into the project before the seemingly random group formation. The trainers want to see either a more structured group formation based off the prior team building or more team building after the formation of the teams.

Q7 – Evaluate from 1-3 the following hubspots: (Unhelpful being 1, helpful being 3)



The business hubspot was found to be the most helpful, whereas the architecture hubspot was found to be less helpful.

Q8 – Any comments of suggestions about the 3 hubspots?

Specific comments reported by the trainers:

- I think they were responding to the topics
- I haven´t taken part in the Nancy hubspot nor the IAAC one, so I cannot give feedback (therefore I chose neutral). I also find it hard to evaluate our own session (WU), but in my opinion it was helpful
- All were excellent even if I was only part of one, but my feedback was strongly positive
- Going out with the students helped them to get new ideas and to have environment, business, and architecture always in their mind
- I cannot comment as I hold one
- Maybe more interaction with the students in some hubspots, only in business hubspot students had to do concrete tasks (in a fun and easy way)
- Make sure all of them are out of IAAC. Align more of what they are supposed to do for the students.

The general feedback seems to be that it is hard to give feedback when the trainers did not participate in all three hubspots and that it would be nice to have more interaction with the students in the hubspots.

Q9 – Do the students´ start-up ideas reflect a well-balanced relation among architecture design, bio-tech, and business?

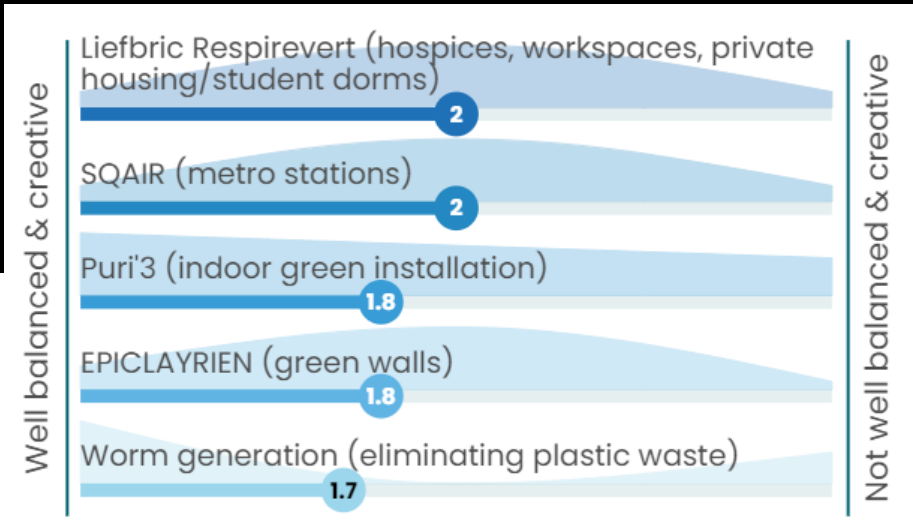
This is what the trainers reported:

- I think yes
- Most of the ideas were well-balanced. The final projects were basically presented by business students- I missed listening to biotech and architecture students- they need to be also trained in selling their ideas
- It is still early-stage, but I feel that, given how far they´ve gotten already, each discipline played an essential part in the process. Some trainers were unhappy that 4 out of 5 ideas are dedicated to air pollution, but I believe it´s the students choice
- Yes of course
- Yes, but I think we could have more time to develop our start up idea before jumping in and developing the concrete product, it could be more rigorous and relevant
- Yes. Incredible how the interdisciplinary team was able to include design, nature based information, and business ideas
- I think the start-up ideas were well balanced among architecture design, biotech, and business
- Yes, everyone seemed to get the importance of combining the three disciplines

- Amongst the field: it looks like it. I think we could spend more time on ideation to open minds to more than air pollution
- Not as much as I expected
- Yes

The general consensus is mostly yes, the ideas were well-balanced, however, some of the trainers wish there had been more time to spend in the ideation phase.

Q10 – Evaluate from 1-3 the following students' start-up ideas: (Well balanced and creative being 1, Not well balanced and creative being 3)



The trainers found the worm generation to be the most creative project, with the Liefbric Respirevert and Squair projects being the least creative projects.

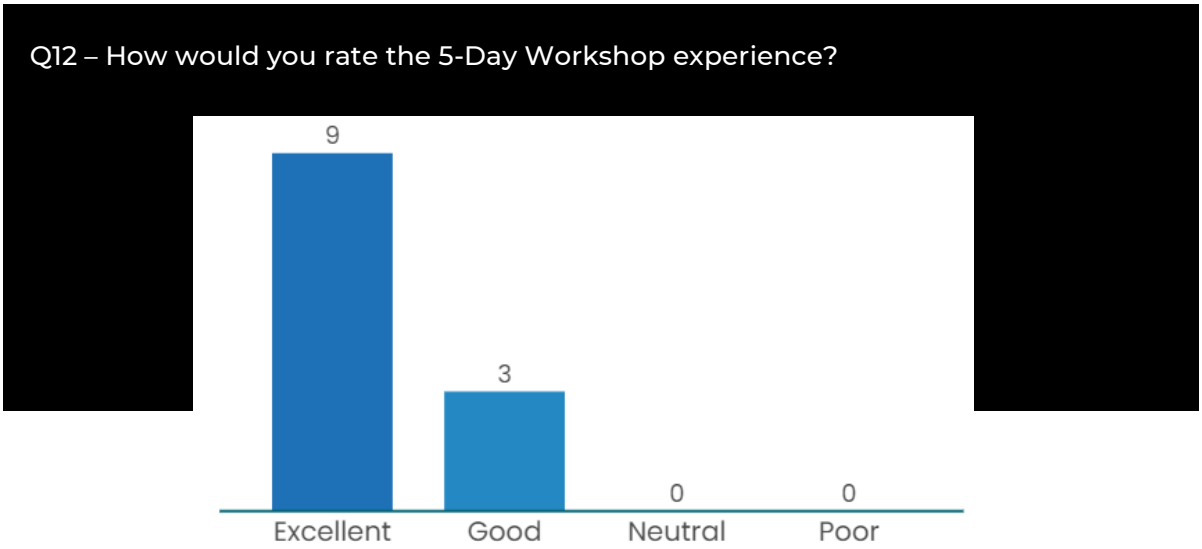
Q11 – Any other comments about students start-up ideas?

Comments from the trainers included:

- Explore more city applications
- We should have spent more time in the ideation process, start-up ideas were too similar
- Feedback barometer between 1-10 would have been better to rate
- 4 of the projects proposed by the students do not face the real source of pollution in the environment: they are trying to find solutions for the consequences of air pollution, except the Worm generation group
- All in the same area (air pollution) and not very creative (green walls already exist)

- It´s honestly not super important if they reinvent the wheel. If they learn to use the disciplines in synergy and they wrestle with risk and work as a team, it´s great. The ideas themselves are secondary.
- I believe the trainers could have made some rules before the idea process with the students, to make the ideas more “spicy” (e.g. it has to be more interactive). Also more emphasis on the fact that ideas can be changed
- Given the scale of creative – neutral – non creative, all of them are creative in my opinion. However, they are already at different stages. Some will be easier to implement, while others might generate a greater impact while also facing bigger obstacles
- My impression is that there was a strong lack of creativity/innovation process. It leads to very similar ideas that are not innovative. There was no real place for interactions between trainers and students that may have alerted them on that.
- My responses were the opposite (thought 1 was poor, 3 outstanding)

Some of the comments included feedback on increasing creativity and innovation during the process. The suggestions were allowing trainers to give more concrete input early on, stressing being able to change ideas, and giving rules in order to force the ideas to be more creative.



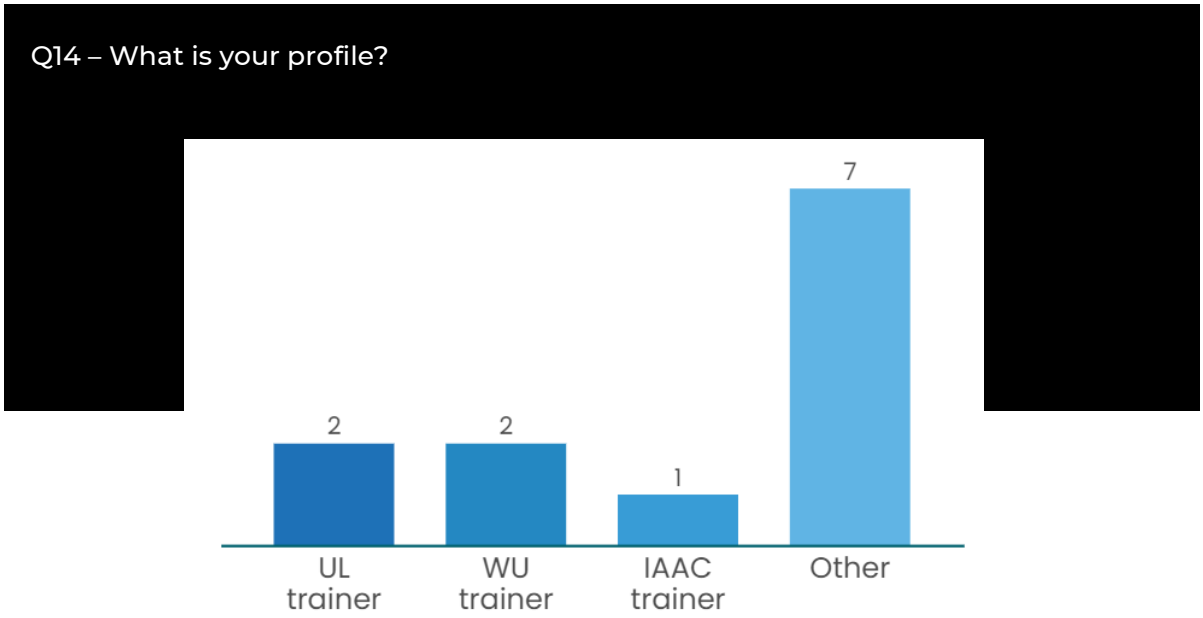
The majority of the trainers would rate the 5-Day Workshop as an excellent experience, with only 3 rating it as good.

Q13 – Any overall comments, feedback, or suggestions?

The feedback received by trainers are:

- Was really surprised in a good way with the results
- Excellent because it was really really great but still I want to comment on the process of creation which was a bit short, but stimulating
- I was extremely happy to see how far and fast the students could move on their own accord. I remember one of the early dinners where the professors were concerned students don´t work independently these days. I think they proved that they can and do
- Some of the groups were more attached to the artistic form of their devices without taking into account that they take significant energy to produce these new objects. For the environment, the worm-generation was the least cost-effective
- I would have liked to have more characters when giving further feedback. I also believe that we need to reflect on the work we did internally as a team and how we can improve this for the next events (e.g. in terms of contribution, etc.)
- To be honest, even if I took part in some preparation meetings, the process and organization of the week was not clear to me considering the gap between what I expected and what happened. But I also learned a lot from this experience
- Great job everyone, it was well done and there are still some parts that can be improved. I don´t see their start-up ideas as something new with a big potential. Students will need much more research and help from mentors to achieve it
- It was a great week and all start-ups can be really proud of their progress

The majority of the feedback was positive, with trainers applauding students for how far they came. However, feedback also included allowing internal reflection, increased organization/structure, and increased focus on cost-efficiency and ideation.



At the end of the 5-Day Workshop, one of the trainers highlighted the following:

Geoffroy – UL Trainer: *"To work with the students was amazing because we discovered that at the beginning there were just 30 students and at the end there were five teams with the great ideas and I think this is only the beginning of the process. From our point of view as the trainers, we learned really a lot about entrepreneurship, and the way we can accelerate things, and make people work together and bring new ideas so it was really a wonderful experience."*

5 – CONCLUSION

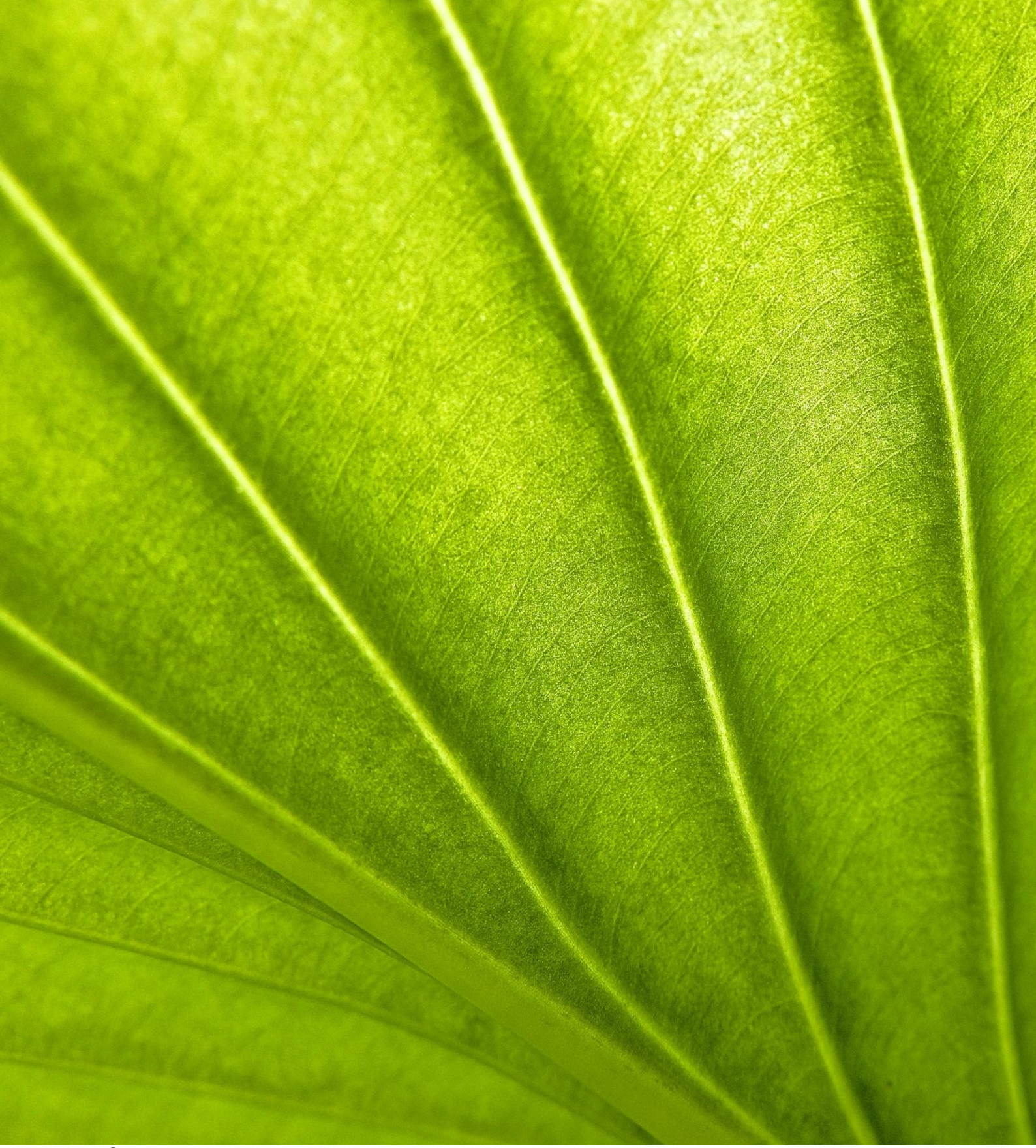
The One-Year Academic Programme aimed at being multidisciplinary, fully interconnected, and that incorporates a business mindset. The activities of the One-Year Programme have been structured using the learning-by-doing methodology where students developed their projects by testing biology concepts, fabricating prototypes, and simulating performances on the market, while being coached by trainers of the three different disciplines as well as by business specialists.

One of the main goals of the 5-day workshop was to have interdisciplinary teams work together to create ideas and solutions that contribute to city resilience and urban re-naturalisation. Given the highly positive feedback on the progress of their projects and the positive feedback on the overall workshop, this goal has been completed. All 29 students rated the workshop useful or better and the experience as good or better.

The recommendations for the future from the students included better group formation and more feedback/knowledge from the trainers to help the students formulate their projects better. The students believe their teams could work better together if the groups were formed based on interests and included more team building after group formation. The students also wanted more feedback from the trainers as they feel it would have helped them be more innovative. The majority of the students felt that their team made great progress in their idea over the five days.

The main recommendation for the future from the trainers included allowing more time in the ideation process to allow students time for more creative ideas and to alter the group formation and group bonding process. Many of the trainers wished that the students had more creative ideas as 4 out of 5 groups focused on air pollution. However, as a trainer pointed out, the knowledge and growth the students gained on natural based solutions is more important than the idea itself.

One of the key successes of the One-Year Programme has been the effective interdisciplinary collaboration set-up that has facilitated an easy exchange, flow and co-creation of knowledge across the three disciplines and across borders!



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