



Deliverable 6.2

REPORT ON PILOTING OF EDUCATIONAL MODULES

Work package number and title:	WP6
Lead-beneficiary:	ECSITE
Work package Leader:	Carmen Fenollosa and Cristina Paca
Contributors	VU, IrsiCaixa, CRA, MUST, EA, AHHA, ESSRG
Relevant Task:	Task 6.4
Dissemination Level:	Public
Due Date (month):	M26 (postponed from M24 with the EC's approval)

Document History and Information

Version	Date	Description and comments	Author
First Draft	11.12.2019	n/a	Cristina Paca & Carmen Fenollosa on behalf of WP6
Reviewer 1	16.12.2019	Comments focused on: <ul style="list-style-type: none"> • Module descriptions • Consistency • Summary or overview of outcomes 	Chrissie Brierley on behalf of WP5
Reviewer 2	16.12.2019	Comments focused on: <ul style="list-style-type: none"> • Clarifying the purpose of the deliverable • Structure and overview 	Barbara Regeer on behalf of WP1, with input from Renée de Wildt-Liesveld and Marjoleine G. van der Meij
Second Draft to coordinator	17.12.2019	Incorporating the comments of the two reviewers and further feedback from representatives of some City Labs (AHHAA, ESSRG, VU).	Cristina Paca & Carmen Fenollosa on behalf of WP6
Third Draft to reviewers	18.12.2019	Incorporating the comments of the two reviewers and further feedback from representatives of some City Labs (EA, IrsiCaixa).	Cristina Paca & Carmen Fenollosa on behalf of WP6
Final draft	19.12.2019	Further feedback from MUST and CRA.	Cristina Paca & Carmen Fenollosa on behalf of WP6
Coordinator	08.01.2020	Feedback from the coordinator	Jacqueline Broerse on behalf of WP9
Final version	10.01.2020	Incorporating feedback from the coordinator	Cristina Paca & Carmen Fenollosa on behalf of WP6

Table of Contents

REPORT ON PILOTING OF EDUCATIONAL MODULES.....	1
1. Introduction	4
1.1 FIT4FOOD2030 project and its competence-building objectives	4
1.2 Purpose of the deliverable	4
2. The FIT4FOOD2030 educational modules and piloting process	5
2.1 Educational modules	5
2.1.1 Target audience	5
2.1.2 Duration	5
2.1.3 Type of learning with society	6
2.1.4 Food 2030 priorities	7
2.2 The piloting phase	8
3. Overview of the piloting of educational modules	9
3.1 City Lab Amsterdam.....	9
3.1.1 Applications in Food and Nutrition Security Analysis (AFNSA)	9
3.2 City Lab Athens	13
3.2.1 Eat It, Don't Skip It!	13
3.2.2 Food Waste	16
3.3 City Lab Barcelona/FIT4FOOD2030 Catalonia	18
3.3.1 Part I: Validating a system map and identifying areas where change is needed	18
3.3.2 Part II: Building future scenarios and action plans for change	18
3.4 City Lab Budapest	22
3.4.1 System Thinking for Food System Sustainability	22
3.4.2 Our Food System and Us	25
3.5 City Lab Milan	28
3.5.1 Valuable Market	28
3.5.2 Visions of Future Food	30
3.6 City Lab Sofia.....	33
3.6.1 I <3 Food	33
3.6.2 Nutrition	35
3.6.3 Specific features of the food system	37
3.7 City Lab Tartu.....	39
3.7.1 Taste Alternative Protein	40
3.7.2 Beeswax Food Wrap	42
3.7.3 Food and Vacuum	44
4. Common themes emerging from the piloting phase.....	46
5. Conclusion.....	48

1. Introduction

1.1 FIT4FOOD2030 project and its competence-building objectives

FIT4FOOD2030 supports the urgently needed transformation of Research and Innovation (R&I) on Food and Nutrition Security (FNS) in Europe. To achieve that, FIT4FOOD2030 will create a sustainable, multi-stakeholder platform, mobilizing a wide variety of stakeholders at the level of cities, regions, countries, and Europe wide. Known as the FOOD 2030 Platform, this network will make R&I policies on FNS more coherent, build competences of current and future researchers, entrepreneurs, policy-makers and society at large, and raise awareness around FOOD 2030.

The three inter-linked structures of the FOOD 2030 Platform are:

- EU Think Tank: the link between the EC and Member States & Associated Countries, with a global outreach;
- Policy Labs to increase and align public/private R&I policies/programs on FNS, building on and expanding existing national/regional networks; and
- City Labs to develop/pilot action-oriented trainings for students, consumers, researchers and professionals linking Science Centers/Science Shops to networks of the Milan Urban Food Policy Pact cities.

Via the structure of the City Labs, WP6's key objective is to deliver a set of transformative, hands-on future-oriented educational modules on food system Responsible Research and Innovation (RRI) and R&I for primary, secondary and university-level students as well as professionals such as entrepreneurs and social agents. In this context, Responsible Research and Innovation principles have been embedded both in the educational activities' design process and in the activities themselves to foster multi-stakeholder engagement, critical thinking, collaborative learning skills and transdisciplinary approaches to food systems learning.

1.2 Purpose of the deliverable

The objective of this deliverable is to document the piloting of educational modules under Task 6.4., capture the changes made as a result of this phase and provide further insights to those looking to use the FIT4FOOD2030 educational modules.

The deliverable has been compiled based on the submissions made by the coordinators of the City Labs and semi-structured interviews between the coordinators and the Work Package 6 leads.

It is recommended that this deliverable is consulted in parallel with Deliverable 6.3 which provides an overview of the 15 modules and contains step-by-step guidelines to implement the educational modules with which this report is concerned.

2. The FIT4FOOD2030 educational modules and piloting process

2.1 Educational modules

The City Labs have developed a combined total of 15 educational modules, self-standing units of study or training, that are nevertheless interrelated with other such units and which can be combined in a number of ways to build up a programme of activities. Each contains a detailed step-by-step guide for module delivery, which can be found in the annexes of Deliverable 6.3 Toolkit for use of educational modules.

During the educational module development process (see Table 4 for a general overview), each City Lab took into consideration their area of expertise (e.g. science centres have significant experience in producing hands-on workshops of shorter duration) and the vision of future-proof food systems developed in their City Lab. This allowed them to determine key characteristics of the educational modules: the target audience and educational level, the learning approach (deep learning or light learning), the topic (connected with the FOOD 2030 Research & Innovation priorities) and the specific competences to be addressed. Further details are available in the sub-sections below.

2.1.1 Target audience

Table 1. Clustering of the modules according to their target audience

Primary school students Food and Vacuum I <3 Food Taste Alternative Protein!	Secondary school students Food and Vacuum Food waste Nutrition Taste Alternative Protein!
High school children Beeswax food wrap Eat It, Don't Skip It! Food and Vacuum Taste Alternative Protein! Visions of Future Food	University students Applications in Food and Nutrition Security Analysis (AFNSA) System Thinking for Food System Sustainability Our Food System and Us Visions of Future Food
Adults (citizens) Our Food System and Us Valuable market Visions of Future Food	Mixed-age groups (e.g. families with children) Beeswax food wrap Food and Vacuum Taste Alternative Protein! Valuable market
Professionals (e.g. journalists, researchers) Fostering change I (Validating a system map and identifying areas where change is needed) Fostering change II (Building future scenarios and action plans for change) Specific Features of Food System System Thinking for Food System Sustainability	

2.1.2 Duration

the length of the modules. There are very short workshops of just 1-2 hrs. Longer workshops of 4-5 hrs. Modules comprising of multiple 1-2 hrs sessions stretching over several weeks to months and complete full-time courses of several consecutive weeks.

Table 2. Clustering of the modules according to their duration

<p>About one hour</p> <p>Beeswax food wrap</p> <p>Food and Vacuum</p> <p>Food waste</p> <p>Taste Alternative Protein!</p>
<p>Several hours to one day</p> <p>Fostering change I (Validating a system map and identifying areas where change is needed)</p> <p>Fostering change II (B Building visions for concrete areas of the system and action plans)</p> <p>Our Food System and Us</p> <p>Specific Features of Food Systems</p> <p>Valuable market</p> <p>Visions of Future Food</p>
<p>Several weeks</p> <p>Applications in Food and Nutrition Security Analysis</p> <p>Eat It, Don't Skip It!</p> <p>I <3 Food</p> <p>Nutrition</p> <p>System Thinking for Food System Sustainability</p>

2.1.3 Type of learning with society

The educational module development in the FIT4FOOD2030 project was inspired by the EU-funded EnRRICH project and methodologies such as community-based participatory research. For EnRRICH, a key design principle for RRI in higher education is 'education with society'. When it comes to concretely applying this principle in educational modules, the project distinguishes two approaches, a light and a deep approach¹.

In general terms, the '**deep approach**' describes a real-time and real-life activity where students learn by performing a project that responds to a real need and which is implemented in coordination with actors outside the classroom.

Table 3. Educational modules taking a 'deep learning' approach

<p>City Lab Amsterdam's Applications of Food and Nutrition Security Analysis includes project work on a real-life problem and delivery of evidence-informed policy advice on a project commissioned by an external institution, such as a city authority or community actor, formulating problem statements and main research questions in direct consultation with the commissioner. Piloting included The Food Council Metropolitan Region Amsterdam as Commissioner; the real-life problem, as it was presented by this institution to the students, is available as an Annex of the module.</p>
<p>City Lab Athens' Eat It, Don't Skip It! module envisages the setting up of a student enterprise that tackles a concrete societal issue, in connection with stakeholders from the food system. The pilot example resulted in grEATboxes.</p>
<p>City Lab Budapest's System Thinking for Food System Sustainability involves consulting a variety of stakeholders on their perception of the local food system. Professionals involved are also supported</p>

¹ Tassone, V. and Eppink, H. 2016. EnRRICH Tool for Educators: (Re-)Designing curricula in higher education from a "Responsible Research and Innovation" perspective. EnRRICH project deliverable. URL: https://www.livingknowledge.org/fileadmin/Dateien-Living-Knowledge/Dokumente_Dateien/EnRRICH/D2.3_The_EnRRICH_Tool_for_Educators.pdf.

in taking the systems thinking tools into their own practices.

City Lab Barcelona (FIT4FOOD2030 Catalonia)'s problem-based modules **Fostering change I** (Validating a system map and identifying areas where change is needed) and **Fostering change II** (Building future scenarios and action plans for change) work towards Action Plans that tackle the transformation towards sustainable and healthy food systems. Stakeholders involved take ownership of the plans. Matchmaking to establish partnerships to carry out the actions can also be envisaged.

A '**light approach**' develops similar competences and discusses similar needs and challenges but confines itself to imparting knowledge in a classroom context, with hypothetical projects. The level of engagement of outside actors is less deep, with site visits, excursions or guest lectures. Implementation tools highlighted by EnRRICH include deliberative methods, dialogic tools, role play for collaborative skills and the design and evaluation of hypothetical projects.

For example, City Lab Athens' module **Food Waste** triggers discussion through the presentation of cases of national initiatives tackling food waste. Students are encouraged to reflect on the differences between approaches and place themselves in the positions of different stakeholders and envisage solutions to the issue.

2.1.4 Food 2030 priorities

Table 4. Clustering of the modules according to the priorities of the Food 2030 strategy. Bolded arrows indicate that the respective priority is considered to be central to the module, as opposed to secondary.

Module/FOOD 2030 priority	Nutrition & Health	Climate & Sustainability	Circularity & Resource Efficiency	Innovation & Communities
Applications in Food and Nutrition Security Analysis	✓	✓	✓	✓
Beeswax food wrap	✓	✓	✓	✓
Eat It, Don't Skip It!	✓	✓	✓	✓
Food and Vacuum	✓		✓	✓
Food waste	✓	✓	✓	✓
Fostering Change I	✓	✓	✓	✓
Fostering Change II	✓	✓	✓	✓
I <3 Food	✓			
Nutrition	✓			
Our Food System and Us	✓	✓	✓	✓
System Thinking for Food System Sustainability	✓	✓	✓	✓
Specific Features of the Food System	✓	✓	✓	✓
Taste Alternative Protein!	✓	✓		
Valuable Market	✓	✓	✓	✓
Visions of Future Food	✓	✓	✓	✓

2.2 The piloting phase

City Labs began by **prototyping** (Task 6.3) ideas for educational modules coming from consultations or workshops with City Lab participants. Prototyping allowed those ideas to take a visible, tangible or functional form, namely development into a set of draft guidelines for the delivery of the educational module. Different stakeholders were consulted about it at an early stage of development, allowing improvement without committing too many resources. Guideline drafts gave way to fuller prototypes that specified all the details necessary to run live piloting with the intended audiences of the educational modules.

Table 5. An overview of the educational modules' development process in the run-up to piloting. Steps A and C refer to co-creation formats prepared by the methodology design team at Athena Institute, VU Amsterdam (WP1). The co-development process varied from City Lab to City Lab.

Some inputs

- Expertise of City Lab host organisation
- Expertise of City Lab participants and coordinators
- Project methodology (visioning exercises, co-creation exercises)
- City Lab outputs (vision, local cases identified, local insights into impact)
- Project outputs (e.g. trend cards, showcase cards, etc.)

Steps taken²

Step A: Workshop on co-creating competences

With the help of tools such as fictitious personae, potentially inspired by real-life actors from national or local (show-) cases, and competences cards for Responsible Research and Innovation and food systems competence elaborated by the project, participants rate competences on a matrix according to their urgency and level of coverage/representations in the current education or (professional) practice. The outcome of such a workshop could be that modules will go on to address in particular competences under-represented and needed urgently.

Step B: Formulating learning goals.

As a subsequent step, learning goals can be formulated for the competences identified. City Lab coordinators were provided with further guidance on possible taxonomies, including formulating learning goals for Responsible Research and Innovation³.

Step C: Co-creating (out-of-the-box) modules

Participants randomly select options from a pre-defined morphological matrix and brainstorm collectively on a module/activity that could respond to those different sets of variables. Ideas can be presented in a plenary, further selected/prioritised or combined until a coherent module has been achieved.

Step D: Securing stakeholder commitment

Developers are encouraged to consider early on who among their network is willing to translate the educational module into a working prototype, or to prototype the module in its early iterations.

Step E: Co-development of the module

² The steps are described in more detail in Deliverable 6.3, A toolkit for the use of educational modules

³ See, for example, the EnRRICH project Deliverable 2.3, 'The EnRRICH Tool for Educators', available online at: https://www.livingknowledge.org/fileadmin/Dateien-Living-Knowledge/Dokumente_Dateien/EnRRICH/D2.3_The_EnRRICH_Tool_for_Educators.pdf

Smaller meetings or interactions can be arranged with stakeholders to gather their input to the modules, pitching ideas, generating commitment and building connections with their activities. The educational module template developed by the project can provide the basis to discuss the different module components in more detail.

When such meetings are unplanned and informal, it might be helpful to write down shortly after some details about the encounter: what prompted the meeting, ideas relevant for module design, decisions or plans for follow-up. Keeping track of such interactions can document how module development occurs and trace back influences and key decisions.

Step F: Testing proof of concept

Doing small tests with one or two users can help demonstrate that an idea is feasible. For example, the coordinator City Lab Tartu went through the educational modules quickly with one user, tried out the hands-on activities and talked through the dialogue methods to receive feedback.

Outputs

- Competences urgently needed but under-represented in the context of each City Lab
- Step-by-step written guidelines for implementing each educational module, amounting to a prototype that can be moved into the piloting phase
- Various tools such as presentation slides, activity cards, and illustrations, as required by the module

For FIT4FOOD2030, **piloting**⁴ (Task 6.4) refers to validating the educational modules ‘live’, in a real context, with a small group of the target audience of the training before implementing or scaling up. Problems are spotted and measures are taken to address them before rolling out the training delivery, to other audiences and in other contexts. The goal to reach at the end of the piloting phase is to be able to confidently say that the educational module works in an optimal way and can be taken to the market, i.e. published for external users interested in FIT4FOOD2030.

In almost all cases, minor changes were introduced by the educational module developers as a result of the piloting phase. The changes (and their rationale) are presented in Section 3 and are already reflected in the guidelines submitted with Deliverable 6.3.

3. Overview of the piloting of educational modules

This section provides an ‘In a nutshell’ description of each of the 15 modules and a description of the set up and results of the piloting.

3.1 City Lab Amsterdam

3.1.1 Applications in Food and Nutrition Security Analysis (AFNSA)

The educational module in a nutshell

⁴ See Nesta (2018). ‘Proof of concept, prototype, pilot, MVP - what’s in a name’. Available online at: <https://www.nesta.org.uk/blog/proof-of-concept-prototype-pilot-mvp-whats-in-a-name/>

Concept: A four-week full-time course that equips students with the analytical and practical skills necessary for an inter- and trans-disciplinary research approach to Food and Nutrition Security challenges. The course is composed of:

- A series of lectures with contributions from guest lecturers from the food system
- Work groups that build on the lectures with in-depth assignments
- Project work on a real-life problem and delivery of evidence-informed policy advice on a project commissioned by an external institution, such as a city authority or community actor

Audience	Bachelor- and master level students
Format	University course blending lectures, work groups and project work
Duration	Four weeks, full time (\pm 160 hours)
Participants	10-25
Facilitation	1 course coordinators, 2-3 'coaches'
Difficulty for participants	Beginner in terms of topic (but about two years of academic training in any discipline is required). Relatively intense in terms of preparation, with several reading materials in advance of lectures and workgroups
Difficulty for facilitators	Facilitators need to have a good understanding of inter- and trans-disciplinary research and its importance for Food and Nutrition Security studies and food system transformation

Piloting set up

The course was piloted with 3rd year bachelor students as well as master students

Module name	AFNSA. Concepts piloted: lectures, work group and project assignment from FIT4FOOD2030
Date, hour	January 2019
Location & context	VU, as part of the 3 rd year minor program Global Food Security Analysis
Duration	4 weeks: 5 lectures of 2 h, 7 workshops of 3h (2h discussion, 1h individual work), 2 training sessions of 2h each, group work
Type of participants	Bachelor students of different disciplines (3 rd year)
Number of participants	15

While running the course, the Lab Coordinator experienced that the transdisciplinary aspect of the course remained at a theoretical level. This difficulty is linked to the short nature of the course; while students gain awareness of transdisciplinary practices, they do not have the opportunity to go in depth and put the tools into practice. Project work within the course is intended to overcome this difficulty. A (fictional) research question was commissioned by FIT4FOOD2030 project on the topic of transition in farming methods. Students were encouraged to think about what stakeholders are relevant outside the farming community, e.g. local policy makers, civil society organisations. Students succeeded in engaging with different types of farmers (e.g. organic, conventional, small-scale, large-scale) as well as with a not-for-profit network organization linked to food production practices. However, it was a challenge to engage with different types of actors in the span of four weeks.

Module name	AFNSA. Aspects piloted: project assignment from a real-life actor as commissioner - connection with the stakeholder
Date, hour	September-October 2018
Location & context	VU, this element was part of the course Analysis of Governmental Policy of the master program Management, Policy Analysis and entrepreneurship in the health and life sciences and the project commissioner was the Food Council of the Metropolitan Region Amsterdam
Duration	8 weeks: 2 work groups x 3 h per week + group work (real-life setting)
Type of participants	1st year Master students
Number of participants	12

The City Lab coordinator further piloted the project work component of the module - this time with a real-life project commissioned by a stakeholder external to the project - in the context of another university course that requires student project work. The group consisted of 1st year Master students rather than Bachelor students, it did have a variety of disciplines, as foreseen by the module. The project commissioner - the stakeholder bringing the real-life problem - was the Food Council of the Metropolitan Region Amsterdam. As a newly established actor in the region, the Food Council was interested in bottom-up food waste initiatives and the collaborative governance developed around them, in particular the needs of such initiatives and the kind of role the Food Council and the local government could play in the governance structure. The student group working on the project interviewed the project commissioner once, with the course coach supporting the students in developing the interview questions. Contact with the project commissioner continued throughout the course. They also identified and interviewed several bottom-up initiatives aiming to reduce food waste.

Both the students and the project commissioner reported positive experiences. Students showed enthusiasm about a real-life assignment and produced high quality work. The commissioner

reported satisfaction with the work students had produced. A key aspect was that the project commissioner’s representative had been a university lecturer; a familiarity with the university setting was beneficial. Moreover, the course coaches have a key role to play in ensuring that contact with the project commissioner and with stakeholders is as meaningful as possible.

A challenge was faced in managing the goals and expectations of the project commissioner with the academic requirements of the course. The initial brief by the commissioner had included an interest in the mapping of food-related activities in the Metropolitan Region Amsterdam, but the academic scope of the course required a more analytical angle. Nevertheless, the student outputs were considered highly valuable by the Food Council.



Figure 1. Students hand over their report to the representative of the Food Council of the Metropolitan Region Amsterdam during the final presentation of the course (2018).

In the stakeholder engagement process, it also became evident that some stakeholders, especially in a city as active as Amsterdam, are contacted frequently by students interested in their work, which could lead to unwillingness on their part to engage. ‘Sensing the field’ would be a good alternative: students visit food related events (discussion evenings, debates, conferences, etc.) and could interview stakeholders on the spot. This would require different skills and techniques, which makes it important for the coaches supporting the students’ project work to be aware early on of the situation in their particular context and prepare students accordingly.

General piloting outcomes

Some key learnings

- Facilitate, as far as possible, participant engagement with external food system stakeholders

- Provide more structure to the work group sessions to make the most of this opportunity to build and strengthen competences

In January 2020, an iteration of the full AFSNA course will be offered again, where some new elements will be piloted and other components implemented for a second time. Building on the first two piloting experiences, two broad changes are envisaged.

More structure will be provided during the work group sessions and competence building exercises (including several suggestions received from local stakeholders in the process of consultation about the course carried out at the piloting phases). Competences around systems thinking will be further developed using exercises on framing and frame reflection - increasing their awareness of different perspectives.

The coaches will facilitate stakeholder engagement during project work to allow students to practice further with transdisciplinarity within the short timeframe. The course organiser, familiar with the topic proposed by the project commissioner in advance, will identify and contact relevant stakeholders at the preparation phase, anticipating the student interviews.

3.2 City Lab Athens

3.2.1 Eat It, Don't Skip It!

The educational module in a nutshell

Concept: Interdisciplinary project for high school students addressing a societal challenge from food and nutrition security perspective by setting up a social enterprise in collaboration with external stakeholders. The activities are carried out as part of a weekly after-school club and the objective is the development of a product (with a related business plan) that tackles the challenge. In their groups, students take on roles found in a real-life enterprise.

Audience	High school students (ages 16 to 17)
Format	Interdisciplinary after-school project
Duration	5 months; 2h/week during term time
Participants	10-15
Facilitation	2 advisors/guides

Piloting set-up and outcomes

Module name	Eat It, Don't Skip It!
Date, hour	October 2018 - April 2019, Fridays at 15:00 during school term time

Location & context (e.g. at own institution, during summer school, etc.)	At the premises of the City Lab host, EA, in the context of an extra-curricular club taking place outside of classroom hours.
Duration	25 sessions of 2h per week, and additional external meetings and interactions with stakeholders
Type of participants	High school students (1st grade) ⁵
Number of participants	22 students, 2 teacher facilitators

Piloting outcomes

Some key learnings

- Working in an enterprise framework, students were successful in reaching out to stakeholders from the food system, including businesses of different sizes
- Developing a business plan is a demanding task and additional specialised support should be offered
- Keep an eye on team dynamics and communication during the team work
- Add as much structure to the sessions of the club and ensure all members contribute actively to team work

The educational module met its objectives: the students cultivated their soft skills and collaboration skills, undertook responsibility and work and learned while exercising autonomy. Since the nature of the task is fully hands-on, the teacher facilitators estimate that students acquired valuable experiences that will be useful to them for many years to come. In terms of outcome, the students developed a final product – the grEATboxes of snacks that are both nutritious, healthy and sustainable - and participated in national event/exhibition at the Athens Mall (February 2019) with a kiosk and dissemination materials presenting the outcomes of their project to a wide audience. From that point on they worked on the business plan of their enterprise.

The module also involved stakeholders to a large degree. Relatives of students were the first source of contacts from which students could get advice on their product. Liaisons with businesses active in FNS were accomplished (e.g. NOYNOY for dairy products, Biocarpos for agricultural organic products, and Stergiou Group of Companies on confectionery products, bakery products and sandwiches). Students approached them in order to seek for advice and expertise regarding the different aspects of the food system, as well as for ensuring sponsorships for the final product. Communication took place initially via phone calls, and was followed by meetings (either the external experts visit the school during the club hours or the students visited them). Feedback is sought not only from

⁵ Secondary school in the Greek framework is divided in lower secondary school or gymnasium (1st grade is Year 7 of schooling, 2nd grade is Year 8 of schooling, 3rd grade is Year 9 of schooling) and upper secondary school or lyceum, non-compulsory (1st grade is Year 10 of schooling, 2nd grade is Year 11 of schooling, 3rd grade is Year 12 of schooling).

representatives from the FNS sector, but also from graphic designers that can support students in the creation of dissemination materials for the enterprise. Additionally, a City Lab workshop that was organised and hosted on the school premises was an additional opportunity for students of the club to receive feedback and exchange insights with representatives from all stakeholder types participating in the workshop (19.12.2018). Representatives from the businesses that contributed to the final outcome also participated in the project presentation at the Athens Mall (February 2019) and interacted with the students and the audience.



Figure 2. Students present their grEAT boxes at Athens Mall.

The piloting revealed that **developing a business plan is a demanding task for students**. A tighter collaboration had to take place with a representative from an auditing company (via email and calls and visits, also participating in the final exhibition) to support students in the creation of the business plan of the virtual enterprise.

In terms of facilitation, problems might arise in the collaboration between students during the year (e.g. due to different perspectives and attitudes), so the **facilitators need to be the mediators for balance and smooth relations**.

The educational module is being implemented in the school year 2019-2020 with 25 interested students. As a result of the piloting experience, **sessions will be run in a more guided way**, with students needing each week to do specific sub-tasks e.g. come up with ideas to discuss during the club hours on topics related to the interactions with experts they have almost each week individually or in their small enterprise groups they belong (e.g. marketing, production department, etc.). Moreover, during the piloting, the different enterprise teams kept a team log or diary of the work they did every week, but in the current implementation, **students keep individual diaries to avoid cases where some students are more active than others**. The general motto is everybody's input is needed for a successful enterprise.

3.2.2 Food Waste

The educational module in a nutshell

Concept: triggering awareness about the issue of food waste from a food systems perspective with the help of materials and (local and European) (show)cases. Student feedback focuses on building critical thinking skills and the creation of an Action Plan, whose further implementation outside of this course could potentially take the module outside of the classroom, from reflection to practice.

Audience	Secondary school students (ages 12 to 15)
Format	Short classroom course
Duration	2-3 sessions of 1 h each; can also be delivered during 2-3 class periods of 50 min to 1 h each
Participants	10-15
Facilitation	Min. 1

Piloting set-up

Module name	Food waste
Date, hour	Period 2-16/12/2019; at times when Civic Social and Political Education is scheduled
Location & context	1st grade secondary school, social and civic class connected with nutrition 3rd grade secondary school, social and civic class, connected with social skills and sociability, social actions, volunteerism
Duration	1 hour
Type of participants	Lower secondary school students, 1 st grade (ages 12 to 13), 3rd grade (ages 14 to 15) ⁶
Number of participants	6 classes of 1st grade, 152 students 5 classes of 3rd grade, 132 students

Pilot outcomes

⁶ See footnote 5 for an explanation of the Greek framework for secondary school

Some key learnings

- The pilot showed that the topic is effective in inspiring students to take on different roles and consider actions to reduce food waste
- Cases that tackle the challenge in different areas can be fruitful for guided reflection
- Ideally, there would be scope to follow up and develop student projects in other contexts

As foreseen, the module was piloted with secondary school classrooms. The curriculum connection used was social and civic education, and more particularly nutrition and social skills and sociability. The presentation of cases about addressing food waste was effective in introducing the problem to the students. The students were able to take different roles e.g. restaurant owner, and make adequate suggestions from those stakeholder perspectives on actions to reduce food waste. Systemic reflection was introduced by guiding the discussion on how food waste can happen in all of the processes of food systems, leading to surprise on the levels of food wasted at various points from farm to fork to gut and back. Environmental and societal implications of food waste were also discussed.



Figure 3. Piloting with a secondary school classroom.

While the classroom activity is limited to the consideration of cases, **the module can prove inspirational for follow-up actions from students**. Ideally, there would be further scope to work on some of the Activity Plans developed during the classroom. After piloting of the module, a group of students was inspired come up with the idea to prepare smoothies to offer to the audience of the event taking place in the end of the school year (where students present their projects) from fruits that would end up in waste otherwise; also exploring the potential to use recycled /sustainable containers and straws. A student visit to the premises of one of the laboratories of the National Technical University of Athens where food products can be 3D-printed from food remains is being organised in 2020 as a follow-up of the pilot.

Unlike initially proposed, international cases were not used due to time constraints and the availability of materials in the local language. As a result, the focus was on two Greek cases - supplemented by an additional element to: **guiding questions to remark on how the national cases approach the issue of food waste differently.**

3.3 City Lab Barcelona

Fostering change in your food system for the promotion of healthy and sustainable diets

3.3.1 Part I: Validating a system map and identifying areas where change is needed

The educational module in a nutshell

Concept: A problem-based learning workshop about understanding the complexity of the food system and thinking in a systemic and transdisciplinary way about change:

- Consensus around shared vision
- Adapting/Validating a system map to local context
- Identifying areas where changes are needed

Audience	Professionals: broad range of stakeholders
Format	Workshop, problem-based learning
Duration	4-5h
Participants	20-30 participants divided groups (no larger than 8 to 10 participants)
Facilitation	1 per group

3.3.2 Part II: Building future scenarios and action plans for change

The educational module in a nutshell

Concept: A problem-based learning workshop to facilitate the development of action plans by building future scenarios and action plans for change:

- Work on identified areas for change
- Co-define vision for specific areas of the system
- Identify leverage points using the map
- Define R&I lines and action items to create change

Audience	Professionals: broad range of stakeholders
Format	Workshop, problem-based learning (+interviews)
Duration	2.5h
Participants	20-30 participants divided groups (no larger than 8 to 10 participants)
Facilitation	1 per group

Piloting set-up

The pilot was carried out in the context of City Lab’s work. The main aim of the workshops where piloting took place was to reflect on the changes City Lab participants wanted to see implemented in the local food system, and to design several prototypes of R&I and action plans to achieve the City Lab’s vision. Both workshop tools were tried as part of the same sessions as they are interconnected and one can build on the other. It is even desirable that the participants stay the same across activities for a more productive use of the tools.

Date, hour	04.03.2019, 15:00-18:00 05.03.2019, 15:00-18:00 06.03.2019, 15:00-18:00
Location & context	At several locations in Barcelona. The pilot was carried out in the context of City Lab work: to reflect on the changes City Lab participants wanted to see implemented and design several prototypes of R&I and action plans to achieve the City Lab’s vision.
Duration	3 hours per session (the first session was simplified: the exploration of the current food system exercise and the visioning exercise of the overall food system where not carried out as they had already been implemented in previous workshops)
Type of participants	Professionals (17 research and knowledge institute representatives, 5 policy, 1 NGO, 1 business)
Number of participants	24 in total across all three days

Part I: Validating a system map and identifying areas where change is needed

Some key learnings

- The mutual learning promoted by the use of a system map can result in high levels of motivation among professionals
- The level of complexity of the system map needs to be considered well and managed in line with the time available and type of stakeholders
- Module facilitators should be experienced both in facilitation techniques and food systems maps and their dynamics

Participants showed a **high level of motivation regarding the mutual learning promoted by the use of the system map** and the reflection that it triggers. An evaluation questionnaire tackled this aspect with several questions discussing the methodology used: on average, participants rated the map as: interesting (4.6 out of 5), the methodology enabling reflection on the complexity of the system (4.6 out of 5), and stimulating and enabling active participation (4.7). The overall methodology was seen as suitable for its aims, namely in the elaboration of future scenarios and action plans (4.3 out of 5). In terms of learning on factors that determine food systems, the score was moderate (3.5 out of 5), likely reflecting the high level of knowledge of participants. Nevertheless, contributions to making connections to food system dynamics scored 4.0 out of 5 even for this specialist participant group.



Figure 4. The food system map in use by participants at the FIT4FOOD2030 Catalonia workshops. They are working around the area of ‘Education’.

Nevertheless, when preparing the activity, it became clear that the system map proposed had **too high a level of complexity**. Within the time allocated to the workshop, participants could not read the map in its entirety and might find the experience overwhelming. The solution found was to design the workshop where each group of participants focused on a concrete area of the map. This rendered the workshop feasible but limited the participants’ perception of the full picture. After the workshop, the factors were clustered, allowing the map to become more compact, while continuing to portray the complexity of the food system. This map is now included in the educational modules guidelines.

Looking towards future implementation, additional points concern further adaptation and facilitation. The City Lab had a predefined vision from previous lab workshops, but other organisations might need to include a **preliminary step of building a visioning statement**, either as a step in the workshop or in a previous meeting or using an online tool. Moreover, the **facilitator needs to understand system maps and their dynamics** as much of the mutual learning happens around these tools.

Part II: Building future scenarios and action plans for change

Some key learnings

- Address tendency to rapidly focus on single, specific interventions when building Action Plans
- Consider running preliminary exercises to introduce the concept of a system map to participants who are less familiar with the notion

In the first part of the activity, participants are asked to describe a future scenario. During the piloting it was noticed that their contributions stay at the level of specificity expected of a vision. This is, very likely, a limitation linked to the limited time available for the workshop. Therefore, the City Lab coordinators decided to rename the activity and avoid calling it “future scenarios”. Instead, they named it again as a visioning exercise focusing on one concrete area of the system. Therefore, the name of this Part II has been modified to read ‘Building visions for concrete areas of the system and action plans for change’.

The workshop facilitators noticed that when each group developed their R&I and Action Plan, participants had the **tendency to rapidly focus on single specific interventions** (with which stakeholders might be most comfortable). This fact raised the question on how to make sure that the solutions that result from the workshops cover different needs for transformation and take participants out of their comfort zone when thinking about actions needed. While the limited time frame does not allow the generation of more than a few solutions, it is considered important to mention the need to simulate reflection on which ones to prioritise and learn how to analyse their diversity and potentially consider the Part II educational module as an instance that needs iteration for more systemic solution generation.

Future plans and adaptations needed: This **tool has not yet been implemented with more general audiences** with lesser technical understanding of the food system. There is an interest on the part of the lab to explore that in the future in a neighbourhood context. A key element for future adaptations is to select stakeholders that can contribute at the right level based on their objectives. Additional suggestions for adapting the exercise for other publics are: preparing the ground by first introducing different concept mapping exercises (e.g. City Lab Budapest’s module ‘Our Food System and Us’), and carrying out a PlayDecide dialogical game around the key problems faced in the food system as a preliminary to the map, to make the task of generating problems more approachable.

3.4 City Lab Budapest

3.4.1 System Thinking for Food System Sustainability

The educational module in a nutshell

Concept: Develop food systems thinking and systems practice abilities via engaging in a co-creative, experiential learning-based process that focuses on a (local) food system challenge:

- Engaging in a (minimum) 5- to 8-week-long co-creative systems mapping and systems understanding process in teams
- An online course and learning support system that introduces various food system aspects, dynamics, challenges and opportunities (accessible at <https://courses.essrg.hu/>)
- A variety of stakeholders are consulted by participants on their perception of the actual local food system. Participants are also supported in taking the systems thinking tools into their own professional practices.

Audience	University students, professionals, adults (16+) from different backgrounds
Format	A course blending workshops, access to content on an online platform and sessions with local stakeholders
Duration	Between 22.5-28.5 h split across a 5- to 8-week period <ul style="list-style-type: none"> - 12 h of facilitated workshop time - 7.5 h individual work using the online component - 3 h dedicated to preparation and stakeholder meeting - (optional) 3x2h for group practice
Participants	12-20
Facilitation	Min 1.

Piloting set-up

Module name	System Thinking for Food System Sustainability
Date, hour	- 4 x 3hr workshops (22.10.2019, 29.10.2019, 05.11.2019, 19.11.2019, from 18:00 onwards) - Online platform with 7.5 hours' worth of content available to participants simultaneously - Stakeholder meeting organized between 5-18.11.2019 (different

	for each team)
Location & context	Open course, advertised at various offline and online channels. Facilitated at Impact Hub Budapest.
Duration	5 weeks
Type of participants	University students (bachelor, master and P.h.D level as well). Members of various NGOs and CSOs. Freelancers coming from various fields. Teacher. All of them very enthusiastic about food system related issues but with very different level of experience.
Number of participants	15

Piloting outcomes

Some key learnings

- Participants considered the course material valuable, and working with system thinking tools useful and impactful
- Build closer, regular connections between the online and offline components of the course to increase use of the online platform
- Allow participants time to understand and practice with system thinking concepts
- Facilitate, as far as possible, participant engagement with external food system stakeholders
- Keep an eye on team dynamics and communication during the team work

Two feedback sessions were held with participants of the course (21.11.2019 and 25.11.2019) and all provided feedback using a questionnaire. They reported that **the course material was valuable: working with system thinking tools is useful and impactful**. When asked to think about what concept, animal or phenomenon would best describe the course, some described it as a bacterium because the concepts tackled are worth to spread fast, as a hurricane because of its intensity and power of the concepts, or as a mushroom, because the course is complex and cannot be easily categorised.

The use of the online platform - intended to be used between sessions - was relatively low. Those who used the online platform reported that it was clear and useful. Regular email **reminders about the online platform** and a closer link between it and the exercises carried out in class are two steps proposed for future implementation.

Another source of difficulty was the length of the course. It was felt that **more time was needed to understand and practice with the concepts**. The original design of the course at the prototyping stage was for university students and a longer course duration, which would have allowed them more time for own work at home. During the piloting, several activities were already removed due

to time constraints. Despite this and the use of some tools repeatedly across sessions, when participants were asked to create a learning timeline of the course, it was noticed that some learning moments were missing. A longer time frame would enable further practice with tools and concepts. Another recommended change is placing more emphasis in each session on reviewing the work done previously.



Figure 5. Group work during the offline workshops of the module ‘System Thinking for Food System Sustainability’

Participants were split into four teams and tasked with identifying and arranging a meeting with stakeholders relevant to their topic. Those who did consider it a useful component in enriching their system map and overall understanding. The facilitator supported this process for those who requested the help, but nevertheless two teams out of four did not carry out the meeting, accentuating the point that **good internal team dynamics and communication are essential for the success of the team work component**. Similar to the point made above, the lengthening of the course would allow the facilitator to simulate a multi-stakeholder workshop, or various World Cafés, to ensure that all teams engage with stakeholders and re-iterate their system map.

Looking towards further implementation plans and adaptation:

- With the aim that module participants become confident about running system thinking processes in their respective professional organisations, a guide on key steps reiterating the key points of the course will be produced by the City Lab coordinator.
- An additional survey will be sent out several months after, to capture the use of the tool by the participants in practice during their everyday and professional lives.
- Moreover, participants had several ideas about how the course can be brought to more audiences, e.g. incorporated into a Master course in human ecology, or proposed as an intensive three-day workshop.

- In early 2020, the module will be adapted by the City Lab coordinator together with the Food Lab Trentino hosted by Fondazione Edmund Mach as a mini-course for a classroom context (8 sessions of 50 minute each).

3.4.2 Our Food System and Us

The educational module in a nutshell

Concept: Using co-creation and reflective exercises to increase self-awareness and generate discussion about the food system and the role and responsibilities of each individual in it

- Guided reflection through association & open discussion
- Developing conceptual maps of the food system in small groups

Audience	University students (18-25) General public (16+)
Format	Workshop
Duration	At a minimum: 90 min – version aimed at university students 150 min – version aimed at a general public
Participants	10-20
Facilitators	1
Difficulty	Intermediate



Figure 6. Participants, in groups of 3-5 people, draw/create a representation of the food system on the flipchart before them. They are free to draw, write, use the post-its, trend cards and pictures and any additional material that they would like.

Piloting set-up

Module name	A. "Our Food System and Us" B. Develop your System Thinking - "Where does your breakfast come from?"
Date, hour	A. 04.04.2019, 10:30 B. 07.11.2019, 19:00
Location & context	A. Semmelweis University, Budapest, in the context of a session in an elective course on Sustainability B. Premises of local civil society organisation 'Inspiral Club'
Duration	A. 120 minutes B. 110 minutes
Type of participants	A. University students from various fields B. General public
Number of participants	A. 12 B. 15

Piloting outcomes

Some key learnings

- The module can help participants achieve a deep reflection mode about the food system and their role in it
- Module facilitators should be experienced both in facilitation techniques and food systems – to be able to follow the group in its exploration
- Participants should be guided to explore the assumptions underlying their understandings
- A less complex system or a sub-section of the food system can be used to bring the topic to general audiences

Piloting (A) with university students from various fields

This piloting took a food system approach closely linked to the perspectives of sustainability. Students considered the general components of the food system using conceptual mapping, focusing on their role in the system. The module worked well to generate discussions among students (and the general public in piloting B) not concerned with food in their studies or daily lives, and who might not have seen themselves as food system actors that can step up and take responsibility. A short final session elicited a round of reflections, or ‘aha moments’, where participants’ responses showed that **a deep reflection mode had been achieved**.

A key lesson learned that came from the piloting process was **the need for a facilitator experienced both in food systems and facilitation techniques**. The City Lab coordinator felt that the real gemstones and understanding moments happened because at certain points in time questions were asked about the assumptions underlying certain statements. This can be captured in part by the guidelines (e.g. suggestions about possible questions to ask) but facilitation skills and knowledge about the system are necessary to follow the group in its exploration and provide relevant insights.



Figure 7. Example of a concept map made by participants during the piloting session

Piloting (B) with adults of different backgrounds

This additional piloting opportunity arose out of an invitation to try the module with a general public at the premises of a local civil society organisation called ‘Inspirational Club’. In approaching the challenge of adapting this educational module for a new audience, the City Lab coordinator considered two possible versions of the module: either the module is applied very specifically to people interested in food systems and is then explicitly focused on this theme and systems thinking is kept in the background, or the workshop focuses on **system thinking more generally and bring in the food system as an example**.

The latter was chosen for a general public, anticipating the fact that they might not possess as much technical information about the food system. In the case of this piloting instance, the general system thinking exercises took longer than foreseen and the exercise bringing the food system in the picture (i.e. tracing back one’s breakfast that is mentioned in the workshop title) did not take place due to time constraints. For future experimentation, the City Lab coordinator advises the **use of a less**

complex system or zooming in on a smaller area of the food system for the successful implementation of the module with such an audience.

3.5 City Lab Milan

General reflections on the City Lab Milan educational modules:

The two modules developed by MUST, host of the City Lab Milan, have at their core an experimental activity that allows the topics addressed to become concrete and interactive. To make the connection between this action and the project’s systemic dimensions is not an automatic process, as the concrete activities do not speak by themselves. Guidance through facilitation is essential for building this link and exploiting the flow between the different moments and formats of the activities.

Likewise, finding connections between the general level of the activity and the personal level of participants (e.g. their personal needs) requires significant effort. Constant attention to, and reinforcement of, the connections between food transformation with the role participants can play is recommended, in the hope that the experience of the activity can become an exercise that participants find themselves called to repeat every day when they are thinking about why ethics and research can make a difference.

3.5.1 Valuable Market

The educational module in a nutshell

Activating citizens in the recovery and redistribution of food and increasing awareness of the issue of food waste and the nutritional value of recovered food, all the while taking part in a concrete action and reflecting on solutions. The module contains two activities:

- Recovering food surplus at risk of becoming food waste at neighbourhood markets
- Experimental activity about the nutritional value of the food collected through an inquiry-based approach and discussion on reasons behind food waste

Audience	Adults; families
Format	2 connected interactive activities
Duration	3h
Participants	10-20, working in groups of 5
Facilitation	Max. of 2
Difficulty	Intermediate

Piloting set-up

Module name	Valuable Market
Date, hour	A. 19/05/2019, from 2.00 pm to 6.00 pm B. 30/11/2019, from 4.00 pm to 5.30 pm (at the market) and 01/12/2019 from 2.00 pm to 5.00 pm (at the museum)
Location & context	A. At premises of MUST B. At the local market (30th November) and the MUST premises (1st December)
Duration	A. 4 hours B. 5h 30 min
Type of participants	A. and B. General public (families composed of adults and children)
Number of participants	A. 50 B. 40

Piloting outcomes

Some key learnings

- Food waste is a subject the general public can relate to and a good starting point for more general discussions
- If it is not possible to carry out part of the activity in a public space such as a local market, stakeholders can also convey key messages during the experimental part of the module
- With mixed-age stakeholder groups, inter-generational dialogue should be encouraged

The focus on food waste is considered an element that works well. Due to its universal aspect, most of **the participants instantly relate** and there is engagement and active dialogue on the topic. This allows the building of a good base from which to take the discussion from the specific to the general aspects of the food system.

The more difficult component of the activity is that which is set in the public space. In neither of the two piloting instances did the MUST team succeed in fully experimenting the recovery of surplus food in the public market, due to weather conditions or the situation at the local market presenting difficulties. This allowed the facilitators to understand that the module can live without the first part. **The market experience can be replaced, if and where necessary,** with a meeting between the volunteers of recup associations or researchers working on food waste and the food system. The recup associations were already quite experienced in interacting with the general public on their

activities. Nevertheless, they appreciated the chance to communicate about their activities through this task and the fact that the communication **experience was deepened with another level of exploration, namely the nutritional value of the food recovered.**

Even when it is possible to implement the two components of the activity (outdoors in the market and at the museum lab), connecting them in a continuous two-phases activity remains difficult due to their taking place at different moments in time and different locations. It is not automatic that the participants in the market exercise will come to the museum for the experimental activity. Therefore, it is important to be able to create a dialogue, during the market phase, where it becomes clear the potential importance of the experimental part. On the other hand, the activity taking place at the museum remains a good access point to the issue of food waste, even if partial.

The piloting involved groups of adults accompanied by children of different ages. During the experiment, parents show a tendency to leave children to do most of the work and step back. In this case, it is important to **encourage discussion among and the involvement of all family members.** Parents can enlarge the understanding of children and the complexity of the discussion - which might be held back because of children's more limited knowledge, e.g. of production methods. In this case, for effective implementation, it should not be just the facilitators addressing the children, but a healthy group dynamic and conversation should be encouraged.



Figure 8. The experimental activity on the nutritional value of the food that would have become food waste

3.5.2 Visions of Future Food

The educational module in a nutshell

Concept: A visioning process and the development of a future scenario with artistic tools, centered on the question 'What will we be eating in the future?'. The activity is structured in several steps:

- Creation of a personal meaning map,
- Experimental activity on proteins in insects-based food,
- A visioning activity leading to future scenarios with novel foods, and

- With the possible intervention of a researcher

Audience	High school students; university students
Format	Workshop
Duration	1.5h
Participants	20
Facilitation	1
Difficulty	Intermediate; regarding facilitation skills, manage the visioning process requires specific competences



Figure 9. Selection of photographs illustrating the different stages of 'Visions of Future Food'

Piloting set-up

Module name	Visions of Future Food
Date, hour	A. 03.06.2019, 10 AM to 11.30 AM B. 12.06.2019, 9.30 AM to 11.30 AM C. 13.06.2019, 9.30 AM to 11.30 AM
Location & context	A. In a classroom (Istituto Luigi Galvani, Milano) during school hours

	B. and C. At the MUST premises, in the museum’s lab, with two groups of high school students
Duration	A. 1.5 hours B. and C. 2 hours
Type of participants	A. to C. High school students
Number of participants	A. 23 B. 20 C. 20

Piloting outcomes

Key learnings

- The module offers a good mix of different components (discussions, creative visioning): a key facilitation skill is to transition between components in a meaningful way
- For a meaningful visioning process, more structure and details can be added to channel participant imagination.

The module was piloted in two locations: at the City Lab host MUST’s own Museum Lab and in a high school classroom, showing the suitability of this workshop to other settings.

An aspect that is seen to be **working well with this module is the mix of ‘ingredients’ provided**. At first the food system is an abstract concept for participants, then it starts to be filled with content in the generation of a personal meaning map. The experimental activity on protein introduces the strong emotions of handling raw meat and insects and triggers discussions on culture, economics, and future research. The visioning exercise that follows allows all output generated to be conveyed in a tangible object, to artistically create connections and discuss them with others in an act of storytelling about sustainable food systems of the future.

Following the first instances of piloting, two broad directions emerged:

- The need to add **more structure and detail to the visioning phase**. Initially this was framed as an open question, and evolved to be framed alongside three topics participants could choose from: the meal of the future, the food production of the future and the food sourcing (i.e. shopping) of the future. Moreover, in the initial piloting, the focus on insects among the visions generated was very high. Facilitators learned to compensate by stressing the possibilities and openness of the visioning themes and questions.

- The **importance of facilitation skills** - which develop further with each iteration of the activity - **to connect the different phases contained in the module**. In other words, to move from the concept map to the experimental activity back to the visioning process in a way that does not just go through the phases but which engages meaningfully with the ideas generated by participants. Additionally, one has to accept the diversity and different forms in which participants choose to express themselves. Further experience and skills to handle the facilitation of creative expression methodologies is needed, in order to make the artistic language effective in this context. The educational challenge is to be able to combine the two experimental approaches (scientific and artistic) to engage participants on the topic at hand.

Furthermore, the piloting with school students revealed that teachers recognise the education value (which might not be immediately obvious), listing both the topic and the delivery of the activity as valuable. Nutrition is an important topic for them, but one that is usually treated sectorially (i.e. the biology of food) and without considering perspectives such as ethics and sustainability. Moreover, the fact that the module is not a top-down lesson but is oriented towards more competencies-focused work and the active engagement of students was considered valuable, not in the least because it is not as common in the education sector as teachers would find desirable.

3.6 City Lab Sofia

3.6.1 I <3 Food

The educational module in a nutshell

Concept: Learn through gamification about healthy food, food production and food origins. The module consists of five activities: the ABC of food, Traffic lights of food, Food and health. Fruits and Food and health. Fruits II.

Audience	Primary school children (age 9-10)
Format	Short school course
Duration	4-5 sessions x 35-40 min; 1 session per week
Participants	10-15
Facilitation	1-3; facilitation can also be carried out by older students
Difficulty	Beginner

Piloting set-up

Module name	I <3 food
Date, hour	27.05-30.06.2019

Location & context	Public school 56 Secondary School "prof. Konstantin Irechek" in the context of a Food Club that was facilitated by 9th and 10th grade students
Duration	1 session of 50 minutes per week, during 5 weeks
Type of participants	2nd grade students as training recipients 10th grade students as facilitators, under the supervision of a biology teacher (with previous professional experience in biofoods and a participant to full series of City Lab Sofia workshops)
Number of participants	20

Piloting outcomes

Some key learnings

- Gamification might stand out in certain implementation contexts; students should be reassured about the module's expectations

The implementation context and target audience match those envisaged by the module prototype. The City Lab coordinator attended two sessions of the Food Club and organised several meetings to discuss the piloting with the teacher: one meeting after the final class, one meeting before the summer of 2019 and two meetings in the autumn of 2019.

The teacher and student facilitators reported positive reactions from the children who appreciated the gamification aspect of the Food Club, and that their projects (pictures, etc.) could be displayed in the school. It was also noticed that at first **students were unsure about what was expected of them and how to participate due to the unusual nature of such activities in the Bulgarian school context.** The student facilitators reassured them about the Food Club's expectations with the support of the experienced teacher who supervised the club.



Figure 10. The game ‘Traffic lights of food’ being implemented in the I <3 Food activity club

Each session nevertheless started with a revision, with students discussing what they learned and applied since the last club lesson. A short survey related to content has been delivered after the activity and the final summary is still forthcoming. Guidance on how to evaluate this activity will be provided as an annex to the educational module.

Following the piloting, based on adaptations that the teacher made during the piloting, all lessons are led as games. Changes were incorporated in the module guidelines on how to make the sessions more game-like. Looking forward to future implementation and adaptations, the school is committed to continue running the Food Club as an alternative to adapting the official school curriculum, which is a lengthy process. Moreover, they are interested in accumulating resources for use throughout the year. The support of the City Lab Sofia has been requested and the implementation of activities coming from other City Labs is being discussed.

3.6.2 Nutrition

The module in a nutshell

Concept: Learn about nutrition and healthier diets, including example tasks that could be elaborate between courses

Audience	Secondary school children (12-year-old)
Format	Short school course
Duration	6 sessions x 45 min; 1 session per week
Participants	10-20
Facilitation	1-2; facilitation can also be carried out by older students

Difficulty	Beginner
------------	----------

Piloting set-up

Module name	Nutrition
Date, hour	8-12.07.2019
Location & context	Summer school, non-standard programme consisting of organised morning sessions (including the module piloting) and afternoon visits to national parks and locations of national significance. Facilitated by the teacher responsible for the summer school, with a background in history and geography and familiar with the students
Duration	4 sessions of 1h over a period of 5 days
Type of participants	12-year-old students from 4 Secondary School "Kiril Hristov"
Number of participants	17

Piloting outcomes

Some key learnings

- When tasks happen outside the classroom, in an open-air setting, tasks should be well specified
- Some module aspects such as writing on post-its should be introduced with care as they can still resemble classroom exercises

The target audience matches those envisaged by the module prototype. The summer school setting is atypical, however, leading to reflections about what this setting entails in terms of adaptation. In particular, the use of the outdoors can be quite distracting, so the facilitator recommends **very focused tasks to take place outside**, and a particular plan in place.



Figure 11. Discussion-led sessions during the ‘Nutrition’ pilot

Students were asked for active participation - to share knowledge, stories, discuss around the topic of nutrition, by starting with knowledge about Bulgarian food culture. Despite the non-classroom context and emphasis on the informality of the activities, it was observed that **some components of the module (e.g. noting answers down) were taken to be signs of classic lessons**, with some reluctance to carry them out at times. This led to further adaptations on the spot, for more discussion-led sessions.

Changes implemented to the module following piloting revolved around even further active participation on the part of the students. No full use of the individual tasks suggested after each session has been made so far due to the atypical setting. It is recommended that future implementations start with an individual task, prepared by students in advance, and propose further tasks that can be carried out at home and discussed in subsequent sessions.

3.6.3 Specific features of the food system

The educational module in a nutshell

Concept: Training and networking event connecting journalists with the food system perspective and the latest insights from food system professionals, including on new perspectives for transformation

Audience	Journalists
Format	Training
Duration	4 sessions x 1 hour spread over a one-day training
Participants	30

Facilitation	4-5
Difficulty	Beginner

Piloting set-up

Module name	Specificities of the food system in Bulgaria
Date, hour	04.10.2019, 10:00 AM - 3 PM
Location & context	Bulgarian Chamber of Commerce and Industry, Sofia
Duration	5 hours
Type of participants	Journalists (23) and smaller group of professionals (3) who work in the food system; 3 keynote speakers, CEO of FoodDrink Bulgaria; Executive Director of the Bulgarian Soft Drinks Association
Number of participants	30

Piloting outcomes

Some key learnings

- Consider stakeholders that will be desirable for the target audience to meet and what co-benefits participants can draw from the training
- Consult key stakeholders and the training recipients to identify the most meaningful food system aspects to tackle

Participants who responded to an online survey distributed after the event (11 out of 23) reported a high level of satisfaction, with an overall score of 9.2 out of 10 to the question ‘Was the training beneficial to you?’. Key points mentioned were the topic subjects addressed, **short and clear presentations accompanied by practical examples, and the competence of the speakers**. One particularly valuable connection was that between journalists and the representative of the National Health Centre for Analysis (focused on food and health). Further training was considered desirable and participant feedback suggested that future events also zoom in on concrete examples and give practical advice.



Figure 12. A food system professional presenting during the piloting of the module ‘Specific features of the food system in Bulgaria’

A main difficulty was convincing journalists to make time in their schedule because of the event duration. This was anticipated and the recruitment of participants started early. Journalists had already been in touch with the City Lab Sofia when their input on the most pressing food system issues had been requested. At the time, they had been told that their answers would be reflected in a workshop organised in the autumn. Nevertheless, one aspect that could be further highlighted is **the networking aspect: the training’s added value of connecting journalists with key professionals**. Further incentives for participation could be the chance to interview some of the presenters; all but one speaker at the training in October were interviewed by the participants. Moreover, if this is intended to be a repeat event, word of mouth in the community is expected to make recruitment of participants easier and its resonance in the press even stronger. At least three articles were published by journalists on the basis of their workshops: e.g. Zlatina Yovkova, *Double standard in foods – myths and reality*, Bulgarian National Radio and Ema Ivanova, *Urban farming - an attempt to revive the connection to land*, Third age (in newspaper related to Senior citizens).

The City Lab Sofia had carried out a series of consultations with different stakeholders to produce an Annex with key information they considered relevant for the Bulgarian context. It proved to be **impossible to cover all topics initially identified**. Several meetings with professionals and the chosen presenters were held to prioritise the information and zoom in on four aspects. The module suggests how this could be carried out in another context.

3.7 City Lab Tartu

City Lab Tartu hosted a FIT4FOOD2030 day dedicated to piloting the modules and inviting students from a local school to their premises. Moreover, all three modules have been included since in the repertoire of activities from which AHHAAs tutors (explainers, facilitators) can choose for the daily workshops held at the science centre. Two such activities are proposed during opening hours and

visitors can register for them on the day. The activities usually attract families and children aged nine to thirteen.

3.7.1 Taste Alternative Protein

The educational module in a nutshell

Concept: Starting a conversation on alternative proteins through a hands-on activity of preparing seitan patties. The workshop integrates and interlinks the cooking and eating process with discussions of health, sustainability, and scientific analysis.

Audience	Primary to high school students; families
Format	Hands-on workshop
Duration	75 min
Participants	20, teams of 4
Facilitation	1
Difficulty	Beginner topic and preparation, intermediate facilitation

Piloting set-up

Module name	Taste Alternative Protein!
Date, hour	A. 15.05.2019, 10:30 B. 16.07.2019, 12:30
Location & context	A. At AHHA, during a special FIT4FOOD2030 workshop-testing-event B. At AHHA, one of the open-for-all-visitors daily workshops (tutors - workshop facilitators at AHHA - can choose themselves which one they want to do)
Duration	A. About 1,5 hours B. About 1 hour
Type of participants	A. Students from multiple classes aged 12-14, from one local school. B. Families, adults and children aged 9-13
Number of participants	A. 25

	B. 15
--	-------

Piloting outcomes

Some key learnings

- Environmental reasons behind dietary shifts were unknown among the target group
- Trying out alternative protein sources generates interest and discussion among participants
- Getting the practical details right is particularly essential for successful implementation: fixed ingredient amounts, care with electrical cords, clean hands are a must

The module Taste Alternative Protein was piloted with 25 children (aged 12-14) and a mixed-age group (adults and children aged 9-13) on the premises of AHHA Science Centre. The workshop is composed of several activities and involves a mix of guided discussion and hands-on components; facilitators felt that the pace felt very demanding. Nevertheless, they reflected that, were some aspects to be left out, there would be a risk that the systemic perspective would not come across as well. Piloting showed that the module can be delivered within the time frame proposed, but its duration can also be lengthened if necessary.

Based on the experiences had so far, it was observed that children consider some dietary choices associated with alternative proteins to be part of popular trends and that motivations for dietary change such as the environmental impact of some foods were still unknown in the age group with whom piloting was carried out. Participants were nevertheless able to cite alternatives to meat; furthermore, they are provided during the workshop with a table with different kinds of foods and their protein content. While this can at first distract students' attention from the discussions, it was seen as a helpful source of inspiration for the discussions. In general, compared to topics such as food packaging covered by other modules, they were able to produce more sophisticated answers about alternative sources of protein.

The experience also involved the **tasting of grasshoppers as an alternative protein source**. The teacher responsible for the students who took part in the piloting spoke - for the first time during the activity - to pose the rhetorical question 'who eats grasshoppers?', an unexpected intervention, that could have been taken to indicate dislike. However, when the facilitator proposed to students to taste grasshoppers after this intervention, all hands in the room rose up and everybody took part in the experience.



Figure 13. Participants knead dough during the special FIT4FOOD2030 workshop-testing-event, 15 May 2019.

Seeing how this is a hands-on workshop, making sure the practical set-up of the workshop goes well is important for its success:

- **Hands must be sanitised** as participants make food with their hands. Ensure that this happens upon arrival and has been completed at the start time of the workshop. Otherwise, this activity risks cutting into workshop time.
- Extension cords may be used to power up the kitchen equipment necessary. Care must be had when handling water. Preferably, **all equipment will be placed at the front of the workshop room and supervised directly by the facilitator to avoid contact between water and electric wires.**
- During the piloting, extra cooking materials were readily made available upon request, resulting in more dough being produced and longer cooking time. When water or flour seems to be in short supply, it is because more effort is needed for kneading the dough. The advice is to **keep amounts fixed and emphasise the kneading of the dough.**

3.7.2 Beeswax Food Wrap

The educational module in a nutshell

Concept: starting a conversation on food packaging and methods to preserve food through a hands-on activity of making one's own beeswax food wrap

Audience	Secondary to high school students (12+); families
Format	Hands-on workshop

Duration	45-60 min
Participants	20, teams of 4
Facilitation	1
Difficulty	Beginner topic and preparation, intermediate facilitation

Piloting set-up

Module name	Beeswax food wrap
Date, hour	15.05.2019, 9:00
Location & context	At AHHA, during the special FIT4FOOD2030 workshop-testing-event
Duration	About one hour
Type of participants	Students from multiple classes aged 12-14. All coming from one local school.
Number of participants	25

Piloting outcomes

Key learnings

- Where possible, encourage teachers or parents to carry out a preparatory activity with students, if the topic of food packaging is unfamiliar
- Start with the hands-on elements of the workshop as early as possible to capture participants' interest early on
- Hot beeswax needs a lot of care and might not be suitable for those under 12 without close supervision

In general, participants felt that the introduction was too long. The facilitator could introduce a hands-on task as early as possible to capture the students' interest. Furthermore, the flow of the activity could be arranged so that the waiting moments during the preparation of the food wrap are used more efficiently for discussion. Further timing changes were made in the guidelines in this respect.



Figure 14. Students discuss issues around food packaging during the special FIT4FOOD2030 workshop-testing-event, 15 May 2019.



Figure 15. Food wraps are laid out to dry in the workshop room.

During the piloting, it was noticed that the topic of food packaging was unfamiliar to students and that group discussions tended to stop quicker than in the other similar workshops. It is recommended that a **preparatory activity is carried out before the hands-on workshop** to raise student interest in and knowledge of the topic.

Additionally, the facilitator had to support students when using hot beeswax as they struggled with this aspect. The target audience age of the module was brought up as **the activity was considered difficult to carry out by those under 12 years of age**.

3.7.3 Food and Vacuum

The educational module in a nutshell

Concept: Discovering how science and research are changing our food system through an exploration of food preservation methods and a hands-on activity, working out the instructions to make one's own vacuum chamber to exemplify vacuum packaging and freeze drying

Audience	Primary to high school students; families
Format	Hands-on workshop
Duration	45-60 min
Participants	20, teams of 4
Facilitation	1
Difficulty	Beginner

Piloting set-up

Module name	Food and Vacuum
Date, hour	A. 15.05.2019, 12:30; B. 14.07.2019, 15:00; C. 16.07.2019, 11:00; D. 17.07.2019, 11:30; E. 02.08.2019, 11:00; F. 28.09.2019, 13:00; G. 14.10.2019, 14:00 x 2; H. 19.10.2019, 14:00; I. 20.10.2019, 14:00; J. 21.10.2019, 14:00; K. 23.10.2019, 14:00; L. 24.10.2019, 14:00; M. 25.10.2019, 14:00; N. 26.10.2019, 13:45
Location & context	A. At AHHA, during the special FIT4FOOD2030 workshop-testing-event B. to F. At AHHA, one of the open-for-all-visitors daily workshops (tutors can choose themselves which one they want to do) G. At Palade environmental education center (outreach activity, two workshops at the same time) H. to N. At AHHA, one of the open-for-all-visitors daily workshops (topic was fixed as it was part of the school break program)
Duration	About 45 minutes
Type of participants	A. Students from multiple classes aged 12-14. All coming from one local school. B. to F. and H. to N. General public (families, including both adults and children aged around 10) G. Children aged 11-16
Number of participants	A. 25; B. 9; C. 12; D. 14; E. 8; F. 6; G. 15, 20; H. 9; I. 11; J. 7; K. 18; L. 15; M. 20; N. 9

Piloting outcomes

Some key learnings

- Assembling the vacuum chamber is exciting and encourages experimentation among participants
- Vacuum packing and freeze drying (as examples of innovation in the food system more generally) are areas that motivate facilitators

The 'Food and Vacuum' module has been piloted extensively with children groups of specific ages and mixed-age groups (adults and children). It has been selected by AHHA staff for implementation on several occasions; they report satisfaction with the overall results of the workshop, and high

excitement from **participants who show a lot of interest in assembling the vacuum machine** (e.g. having to keep an eye on the details, understanding the procedure, collaborating with people in the group in the making of it). Nevertheless, for smooth implementation, they recommend the use of this module with groups of students of the same age, so as to allow a speed of work that suits everybody and leaves nobody behind.

The multidisciplinary nature of the workshop, its connection with physics, is seen as an added value. There is nevertheless a risk that the activity becomes too much oriented to this aspect to the detriment of food-related discussion. Nevertheless, based on the piloting, it was observed that facilitators not connected with the FIT4FOOD2030 project continue to emphasise the connections between the task at hand and the use of vacuum packaging and freeze drying in the food system, finding the overall content and message, including its novelty, interesting.



Figure 16. Participants test the effects of vacuum on marshmallows during the special FIT4FOOD2030 workshop-testing-event, 15 May 2019.

Students find vacuum packaging familiar and are able to generate many answers to the discussion questions proposed. **Observing the effects of the vacuum chamber** on marshmallows and other products that can change shape was seen as particularly exciting; participants, at their own initiative, were seen placing their phones in the chamber to test the effect of vacuum on sound travelling.

Looking ahead to further implementation, this workshop could be elaborated to add optional pieces or wrong pieces in the making of the vacuum machine to build further the experimentation aspect and competences for collaborative work.

4. Common themes emerging from the piloting phase

In general, the educational modules worked well in practice, presented interesting topics for participants and triggered discussion and reflection. Nevertheless, as expected from the piloting phase, the need for some changes did emerge. Some common themes and concerns appear across modules and audiences.

A key concern is striking **a good balance between the ambitions of the educational modules** – ideally, the modules would go in depth and result in participant confidence about using system thinking tools, rather than simply raise awareness – **and the limited duration of the workshops**. Longer courses can be off-putting, especially in the recruitment of participants, and more difficult to fit into certain implementation contexts such as classrooms. Having said that, participants to the 5-week course of the City Lab Budapest, System Thinking for Food System Sustainability, reported wishing the course to have been longer. Perhaps, preparations such as teaser trailers of the educational modules can be helpful in the recruitment, persuading audiences of the value of the module and securing their longer commitment.

Real-life stakeholder engagement is considered a key element of the modules but due to the limited duration of most of the modules, participants cannot carry out all the steps leading to engagement. Some aspects such as identification can be carried out by the course facilitators in advance (e.g. in the cases of modules AFNSA from the City Lab Amsterdam and System Thinking for Food System Sustainability from the City Lab Budapest). Moreover, those who implement the educational modules should take seriously the responsibility of ensuring that contact with stakeholders is as meaningful as possible for participants and as considerate for the stakeholders' time and resource constraints.

The **importance of facilitation** in achieving the educational modules' objectives, and in particular in creating several kinds of beneficial objectives, is a repeating motive. One such objective is making the link between concrete hands-on activities (like in the case of the modules developed by the City Lab Milan and City Lab Tartu) or insights from one aspect of the system and the broader food system perspective.

Likewise, finding **connections between the general level of the activity and the personal level of participants** (e.g. their personal needs) requires significant effort. Constant attention to, and reinforcement of, the connections between food transformation with the transformative role participants can play is recommended, in the hope that the experience of the activity can become an exercise that participants find themselves called to repeat daily when they are thinking about why responsible research and innovation can make a difference.

Furthermore, facilitating certain processes such as future-oriented creative thinking needs further strengthening in the community of practice for transformation. In this regard, the publication of the methodologies and guidance on facilitation developed in WP1 will be beneficial.

Following the piloting experience, the education module developers choose to add **more structure and guidance** to various components of the educational module (e.g. the AFNSA work groups; adding specific sub-steps to the club meetings of Eat It, Don't Throw It!).

Finally, the piloting experiences raise questions about **the level at which the complexity of the food system needs to be represented with certain audiences for transformative effects**. Further guidance for both current City Lab coordinators and future users of the educational modules will ideally be provided by the project's methodologies and training.

5. Conclusion

As foreseen in task 6.4, the piloting process of the 15 FIT4FOOD2030 educational modules took place in schools, science centres and museums, universities, and reached the target audiences of primary school students (n=20), secondary school students (n=410), high school students (n=85), university students (n=40), professionals (n=71) and mixed groups of adults and children considered as the general public (n=258). As expected from the piloting phase, the need for some changes in the design of the guidelines did emerge. They have been incorporated into the guidelines that form the basis of Deliverable 6.3, Toolkit for use of the educational modules, which will be able to support future users of the modules – be it the Food Labs that joined the project in October 2019, or the wider community interested in competences for food system transformation.