SCHOOLS AS LIVING LABS

SALL

DELIVERABLE 5.2: INTERIM EVALUATION REPORT

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Table of Contents

Index of Tables

Index of Figures

Executive summary

The 'Schools as Living Labs' (SALL) project is a Coordination and Support Action (CSA) funded under the Science with and for Society (SwafS) objective of Horizon 2020 (H2020), the Research and Innovation Programme of the European Union. In particular, SALL is a project serving Europe's aim to promote open schooling in the context of science education through the collaboration of schools with external stakeholders in solving real-world problems. Moving in this direction, SALL proposes the Living Lab (LL) methodology as a technique for the development of open schooling activities linked to science learning in Europe's schools. Furthermore, SALL chooses to demonstrate the use of this technique through activities prioritizing a focus on the theme of the food system and its links to the Food 2030 research and innovation policy of the European Union.

The SALL team, including ten consortium members and three linked third parties, consists of institutions from twelve countries (Belgium, Croatia, Cyprus, Estonia, France, Greece, Israel, Luxembourg, the Netherlands, Portugal, Serbia, Spain) representing diverse worlds: schools, universities and research organisations, science museums and centres, NGOs, business. Dialogue and mutual learning among these worlds lie in the heart of SALL.

The objective of WP5 'Evaluation' in SALL is to assess the impact of the proposed SALL methodology on individuals and organisations involved, as well as more widely on their social context. Also, the evaluation of the project focuses on studying the transferability and adaptation mechanisms that may facilitate and support the effective application of the LL approach in other relevant contexts of science learning. Thus, the formative assessment of the project concerns the collection of feedback in the course of the development and implementation of the SALL methodology for open schooling, to improve the methodology and its implementation in schools. The impact assessment establishes the extent to which, and ways in which, the proposed LL methodology has inspired partnerships between schools, local communities, civil society organisations, universities and industry in the following ways:

- In the short term: it aims at contributing to a more scientifically interested and literate society and students with a better awareness of and interest in scientific careers
- In the medium term: it anticipates to provide citizens and future researchers with the tools and skills to make informed decisions and choices
- In the long-term: it aspires to contribute towards the European Research Area (ERA) objectives of increasing the numbers of scientists and researchers in Europe.

The present document constitutes deliverable D5.2 'Interim Evaluation Report', which focuses on presenting the impact of the implementations in the focus schools of the project (year 1) through an

in-depth analysis. The evaluation procedures included the collection of feedback and data from all participatory levels of a LL project (i.e., students, teachers, administration staff and societal actors) with the use of three evaluation tools (questionnaires, case study reports, and SWOT analyses; see Section 3.1 for more details). The data were analyzed quantitatively or qualitatively (see Section 3.2 for more information).

The case study reports yielded different pathways a LL project can follow for the planning stages with the involvement of societal actors, as well as the types of prototypes the participants created and tested (see Section 4.2 for details). The results from the students' questionnaires showcase the development of students' self-determination and career motivation, as well as the impact of the different LL pathways on their civic engagement and attitudes (see Section 4.3 for details). Finally, the SWOT analyses present participants' beliefs, expectations, and interaction before and after their participation in the project, and reveal how these facilitated or hindered the implementation of their school projects (see Section 3.4 for details).

Overall, the findings reported in D5.2 demonstrate that the SALL methodology was particularly successful in supporting collaboration and productive interaction among the participants of a LL and in facilitating the development of an open-schooling project. The findings led to suggestions for good practices for the wider community and schools that are interested to implement the LL methodology in their own contexts (summarized in Section 4.5), as well as to the refinement of the evaluation tools and protocols of conduct to be used for years 2 and 3 of the SALL project (see Section 5).

1. Introduction

The objective of WP5 'Evaluation' in SALL is to assess the impact of the proposed SALL methodology on individuals and organisations involved, as well as more widely on their social context. Also, the evaluation of the project focuses on studying the transferability and adaptation mechanisms that may facilitate and support the effective application of the LL approach in other relevant contexts of science learning. Thus, the formative assessment of the project focused on the collection of feedback in the course of the development and implementation of the SALL methodology for open schooling during year 1, to improve the methodology and its implementation in schools and specifically, to inform the work of the other work packages of the SALL project (primarily WP2-4), as well as to support the National Coordinators (NCs) during school implementations.

The deliverable D5.2 'Interim Evaluation Report' focuses on presenting the impact of the implementations of the focus schools during the pilot phase (year 1) of the project through an in-depth analysis. This in-depth analysis was focused on the modular evaluation toolkit developed (D5.1 "Evaluation Framework"). The main objective of the study was to suggest improvements in the SALL methodology and, also, to refine the evaluation procedures for the accomplishment of a lighter evaluation process that can be used during years 2 and 3 of the project, based on the findings and participants' and partners' suggestions. Given that the SALL methodology will be refined after the pilot phase, the tools and protocols of conduct for years 2 and 3 (wider community of the SALL project) were developed based on the findings of the in-depth study and the refinement of the SALL evaluation methodology (see Section 5).

It is noted that all the evaluation procedures were developed and implemented in accordance with the ethics and data policies of the project, as presented in the Ethics Handbook (D7.4) of the SALL project.

This deliverable is divided into four sections. In the first section, we present brief information in regards to the SALL methodology and relevant materials and deliverables. In the second section, the methodology for collecting and analysing the data is presented. The third section focuses on the presentation and discussion of the findings of the in-depth analysis, and the fourth section concerns the presentation of the tools and protocols of conduct developed for the wider community of the SALL project.

2. The SALL methodology

The SALL methodology proposes a LL based open schooling approach which was developed through a co-creation process among the project's consortium members, participants (e.g., teachers, societal actors, students), and experts in the field of open schooling, LL approaches and the food system. For its effective application in practice, different materials and guidelines were developed, all of which are encapsulated in WP2. Below we provide some brief information about relevant deliverables which encompass the SALL methodology and which were available as materials and as support tools to the NCs and schools.

In the **Deliverable 2.2: "Co-creation workshops on applying living lab methodology to open schooling: methodology and results"** the co-creation process for developing the SALL methodology is presented which was achieved through two on-line workshops and nourished by the field experience of NCs working along with focus schools during the first half of 2021. The overall results of this process are summarized in the document "Roadmap for Schools" (cf. Deliverable 2.3: "The SALL Methodology"). The Roadmap was developed to support NC(s) and teachers. It gives an overview of the whole methodology so that each local actor may fully understand the "big picture", what they should expect and what they are committed to. It also provides guidelines and practical hints for implementing the SALL methodology.

The final SALL methodology is presented in **Deliverable 2.3: "The SALL Methodology"**. The methodology is an adaptation of the Living Lab approach to the school context. The aim is to run Living Lab projects at schools, involving students and other local societal actors in a user-driven innovation process. This approach has the potential to take open-schooling to a new level by increasing the involvement of local actors and the influence of students about the local environment, in collaborative work on innovative solutions. The thematic focus chosen as the starting point for SALL is rooted in one interdisciplinary theme, the Food System, which has been integrated with the methodology. Below, we present some basic information in regards to the SALL methodology presented in this deliverable which was implemented by the schools during year 1.

The key principles of a SALL school project were defined as:

1. Real issue - real solution, making use of the participants' personal experience
2. Co-creation, involving of all impacted societal actors
3. Quick prototyping, as ideas are immediately put in practice and tested.

Setting up the LL projects. Setting up a SALL Living Lab project entails building several elements which will be the foundations of the future project. Those foundations are crucial, as they will determine the constraints, the possibilities and the assets of the future projects. These are as follows:

1. Exploring the Food System theme
2. Engaging societal actors and building a partnership
3. Choosing a topic in the Food System theme
4. Setting up the evaluation framework

Implementing the LL projects. Once set up, the LL projects operate using an iterative cycle comprising of four steps: **Co-creation, Exploration, Experimentation, Evaluation**. This cycle, which is presented in Figure 1, can be repeated to improve the solutions designed.

Figure 1: The SALL Living Lab cycle (as presented in the document "Roadmap of schools")

The application of the SALL methodology in practice can be achieved through appropriate training and support materials. In the **Deliverable 2.4: "Development of training and support materials for Schools as Living Labs"** a compilation of the materials produced during the process of engaging societal actors and co-creating a methodology that allows the reflection on local problems relating to the food system in an active, engaged, and experimental way are presented. These materials were developed by NC(s) and/or work package leaders and are accessible in the project's website and the SALL Community Platform.

In addition, practical guidance on how to engage relevant stakeholders in their LL activities meaningfully and sustainably was also available to NCs and participants (work realized in WP3). Specifically, the **Deliverable 3.1: "Methodology for the engagement of school living labs with stakeholders"** presents a roadmap offering suggestions for schools and NCs on how to identify societal actors, how to approach them, and how to create a sustainable connection with them. The **Deliverable 3.2: "Practical guidance and training materials for the engagement of school living labs with stakeholders"** aims to make the Stakeholder Engagement Methodology accessible and immediately

usable by schools, through the production of practical guidance and training materials addressed to members of the school communities on how a school LL activity can involve relevant societal actors.

To facilitate the implementation of the SALL methodology (objective to be achieved through the work constituting WP4), the **Deliverable 4.1: "School preparation materials and tools"** offers an overview of the preparations for the implementation of the initial piloting of the methodology proposed by SALL. It concisely reports on the overall situation, the different strategies and materials to be followed for engaging schools, how NCs can be supported, as well as the needs of NCs, schools and teachers in their efforts to design and implement school-based LL projects.

The table below details the resources included in the aforementioned deliverables which aimed at supporting teacher training and the implementation of SALL school projects.

Table 1: Resources for schools and NCs included in deliverables related to the SALL methodology

Submitted deliverables	**Support and training materials for schools and NCs**
D1.2 The SALL community of schools exploring living-lab-based open schooling	The SALL pitch to schools
D2.1 Commented bibliography and relevant case studies	Examples of Living Labs (padlet) SALL significant cases (padlet)
D2.2 Co-creation of the SALL Framework – co-creation workshops	Case clinics Master classes
D2.3 The SALL Methodology	Roadmap for schools
D3.1 Methodology for the engagement of school living labs with stakeholders	Stakeholder Engagement Workshop (PowerPoint presentation)
D3.2 Practical guidance and training materials for the engagement of school living labs with stakeholders	Stakeholder Engagement Workshop (PowerPoint presentation)
D4.1 School preparation materials and tools	SALL school project examples

Of course, there are other deliverables in progress oriented to the organisation and support of the NCs and schools. The present deliverable focuses on presenting the impact of the proposed SALL

methodology on individuals and organisations involved, as well as more widely on their social context, information which can support the enhancement of the SALL methodology and its implementation in schools and subsequently the work of the other work packages of the SALL project (primarily WP2-4).

3. Evaluation procedures of the pilot phase (year 1)

3.1. Data collection procedures

A timeline was developed for the three years of implementations of the SALL project (see Table 2 below). The focus community of SALL schools located in the 10 partner countries (Cyprus, Greece, France, Israel, the Netherlands, Portugal, Spain, Serbia, Croatia and Estonia) participated in an in-depth evaluation process during the pilot phase of Year 1 in order to help the project consortium in developing a comprehensive understanding of the impact of the SALL methodology on all participants, refine the tools and materials provided based on the lessons learned, and to maximize the impact of the project in years 2 and 3 during which larger-scale implementations will be carried. These larger-scare implementations will involve not only the focus community, but also the wider community of additional 370 schools, reaching overall a number of 412 school communities in 9 countries. Based on the findings of this Interim Evaluation Report and the feedback of partners, the tools for years 2 and 3 were developed or the existing ones from year 1 were adapted accordingly, and the suggested evaluation procedures were defined (see Section 5).

As presented in Table 2, a pre-post design was followed for the evaluation of the LL methodology to identify changes in the four participatory levels after the implementation of the SALL methodology in all participating countries.

Table 2: SALL Evaluation Framework; Evaluation tools per evaluation level for each implementation year of the SALL project

	YEAR 1 FOCUS COMMUNITY			**YEAR 2 WIDER COMMUNITY**		**YEAR 3 WIDER COMMUNITY**	
Participation level	**Pre-Year 1**	**Post-Year 1**		**Pre-Year 2**	**Post-Year 2**	**Pre-Year 3**	**Post-Year 3**
Students	Questionnaires	Questionnaires	Case studies	Questionnaire	Questionnaire	Questionnaire	Questionnaire
Teachers	Expectancies SWOT	Impact SWOT		Beliefs questionnaire towards SALL approach	Beliefs questionnaire towards SALL approach	Beliefs questionnaire towards SALL approach	Beliefs questionnaire towards SALL approach
Schools				Beliefs questionnaire towards SALL approach	Beliefs questionnaire towards SALL approach	Beliefs questionnaire towards SALL approach	Beliefs questionnaire towards SALL approach
Societal Actors				Beliefs questionnaire towards SALL approach	Beliefs questionnaire towards SALL approach	Beliefs questionnaire towards SALL approach	Beliefs questionnaire towards SALL approach

Two questionnaires were developed for the students' participation level: The *Science Attitudes Questionnaire* and the *Civic Engagement Questionnaire*. The first questionnaire assessed the impact of the schools' implementations on students' science attitudes based on six dimensions (intrinsic motivation, career motivation, self-determination, self-efficacy, attitudes towards practical work in science and attitudes towards science outside school) and the latter questionnaire assessed the impact on students' civic engagement that pertains on measuring students' views about their active citizen engagement in the life of their community in order to improve conditions for others or to help shape the community's future.

The SWOT analysis was used as a means to identify the impact of the LL methodology on the rest of the participatory levels (teachers, school, societal actors). It was performed before (Expectancies SWOT) and after (Impact SWOT) the schools' implementations. The Expectancies SWOT was completed to support participants in the planning of their school projects and to get an insight on how the SALL methodology was conceived by them before the implementations. The Impact SWOT was completed at the end of the implementations to get an insight of what the impact of the SALL methodology per participatory level was. A semi-structure interview protocol (see D5.1. Evaluation Framework for more details) was developed for each participatory level (i.e. teachers, schools, societal actors) for collecting the data for both the Expectancies and Impact SWOT analyses. In the table below the methods for collecting the information in each country are presented:

Table 3: Methods used in each country for collecting the data for both SWOT analyses

#	Country	Method(s) used for collecting data for the Expectancies SWOT	Method(s) used for collecting data for the Impact SWOT
1	Greece	Emails, questionnaire	Emails with a translated version of the SWOT questionnaire
2	Croatia	interviews, video-interviews	Phone calls, interview in person
3	Portugal	Emails	Emails with a translated version of the SWOT
4	France	Phone calls, face to face meetings, online meetings, emails	field visit, meeting, phone call
5	Netherlands	Online workshop	online workshop
6	Serbia	Focus group	focus group/online focus groups
7	Estonia	Zoom calls, e-mails, short Google forms questionnaire	zoom calls, e-mails, short Google forms questionnaire

8	Israel	Online workshop, online questionnaires, short phone interviews	online meetings, online questionnaires
9	Cyprus	Emails, google forms, phone calls, online meetings	Emails, google forms, phone calls, meetings
10	Spain	Interviews, emails with a translated version of the SWOT questionnaire	

The case study reports were created by the NCs based on a template developed for scaffolding their case study report development (one per school project). The rationale behind developing the case study reports was to collect important information about the (i) type of involvement of participants in the project and (ii) the type of projects implemented, and to identify frequent challenges and examples of best practices for implementing a SALL school project in the context of food system in order to enhance the SALL methodology during the future implementations.

Finally, the following demographic information of the participants of the evaluation procedures of year 1 were obtained, through the case study reports and the students' questionnaires:

- subject domain(s) of the teachers involved in the project,
- the positions of the administration staff involved,
- the type of societal actors involved,
-the age and gender of students.

Detailed information on the tools and protocols of conduct developed for the pilot phase of the project are presented in D5.1 "Evaluation Framework". The monitoring and provision of support for the data collection processes in all countries was accomplished through email exchanges, during the weekly meetings of partners and monthly meetings for NCs (organized by the coordinators of the WP4 package). An online excel file was also created for keeping track of the data collection processes of each country. The Evaluation Framework of the SALL project was developed to accommodate different national curriculums, school cultures and participants' identities. Due to its flexibility and practicability, most of the NCs were able to implement successfully the evaluation procedures and to support their schools during the year 1 of the project, even though most of the schools had to adapt to a new reality due to the covid-19 pandemic. Below, we provide some context-specific information on how each country's educational system adapted to the pandemic (e.g., online lessons, visitor ban) and how the NCs managed to provide, to the best of their ability, support to the schools to plan and implement their projects.

Serbia. Serbia's NCs underlined that, because of the COVID-19 crisis, problematic situations have surfaced for the education system in general, making it difficult to remain focused on the project in the face of such a dynamic situation. In terms of the pandemic's impact on the evaluation procedures for collecting the data it was noted that this was extremely unpredictable, with schools alternating between online and offline work and attempting to hold as many face-to-face sessions as possible. Despite this, the schools were able to continue working on their projects, communicate via online meetings, and postpone some activities until later in the year. However, because many students and teachers did not own a computer, online meetings were difficult to schedule, and as a result, there will be more work to be done in the next year of the SALL project.

Estonia. In year 1 of the SALL project, two lockdowns occurred in Estonia, which was a tough period for the schools because most of the educators were unfamiliar with online teaching tools. When schools finally opened, NCs and societal actors were not allowed to make visits. Thus, the teacher in charge of the project communicated with all the participants via online meetings, phone calls, and emails, which was a new experience for teachers and societal actors. Furthermore, students were spending a lot of time in front of a computer screen, thus finding time for additional project-meetings was challenging, which also had a direct impact on the progress of the project. Due to the Covid-19 restrictions, reaching out to societal actors (in a more meaningful/practical way) and integrating them into the project team was difficult. As a result, the schools wanted to wait until they could meet face-to-face. The majority of the schools began their projects in the middle of the school year and elected to concentrate mostly on the planning phase of their project, continuing their work in the following school year.

Cyprus. During the first year of the SALL project, Cyprus was subjected to two lockdowns, during which schools were closed and lessons were offered online. Hybrid classes (in which some pupils were physically present in the classroom and others were present online) were quite prevalent during the months when the schools were progressively opening (based on protocols) and NCs or societal actors were unable to visit the schools. Hence, the communication with all the participants was done through online meetings, phone calls, emails etc., mainly through the teachers who were responsible about the project. Due to the restriction of access in schools and the limitations of the digital tools available in some schools, the active participation of societal actors in the school projects was very difficult. Also, for primary and middle schools the lessons offered online concerned only some main subject domains (Language, Mathematics, Physics etc.) and hereafter no additional time was available for working on the project. As a result, most of the schools started their projects in the middle of the school year and decided to focus mainly on the planning phase of their project and, in some cases the schools managed to reach up to an initial test of their prototype within the

school. Since additional online school meetings for the LL were very difficult for the schools to organize, problems in active and real-time participation of all the participants were observed and hence, due to asynchronous communication, the implementation of actions and decisions took a lot of time. The initial identification and communication with societal actors were also done by the NCs in most cases. This action was extremely beneficial for the students since it established open contact with societal actors and for the teachers since this task was considered as an overload during hectic school schedule.

Portugal. Schools and students in Portugal experienced a series of lockdowns last year from the middle of February to the first week of April, with ten days of no school and the rest of the time spent learning online. These lockdowns and online lessons were extremely detrimental to students' learning, due to technological restrictions (lack of computers, poor internet networks), as well as the difficulties of delivering the content of the curriculum without face-to-face interaction. The SALL project was extremely difficult to be implemented during the school year 2020/2021 since online classes severely reduced contact among students and between students and societal actors. Even in face-to-face classes, there were severe restrictions on students visiting external entities and/or societal actors. Some of the meetings with societal actors had to be held online, and even those that were held in person were always hampered by the social distancing regulations imposed on public gatherings, which led to counterproductive actions of students' and the rest of the school community's creative processes. Considering face-to-face meetings were difficult to implement, they relied heavily on emails and online sessions. One positive aspect of their online meeting sessions was that they held them simultaneously for all of Portugal's schools (which was highly useful for exchanging experiences and concerns), as well as one school at a time (with very positive results when the purpose was to deepen the work of each school).

Croatia. Due to COVID/19 constraints, the majority of Croatian schools conducted online lessons for the school year 2021. Online meetings, phone conversations, emails, and other forms of contact were used to communicate with all the participants, mostly through the teacher who was responsible about the project in the school. The protocol regulations imposed due to the pandemic prevented the teachers and the students from visiting the local agricultural sites and producers, which were going to support them to connect their project to food production. Furthermore, due to the multiple challenges that online schooling posed to the usual core topics, there was a shortage of time to develop extracurricular activities. Nevertheless, the NCs provided short movies featuring interviews with agricultural producers involved in the project and thematic movies were included into geography lessons dedicated to local economic activities. Students were also encouraged to actively participate in overcoming various issues set forward by agriculturists, such as designing a logo for their company or creating a commercial tagline. When COVID

restrictions were lifted in May, they scheduled a field trip for students to a local sheep farm and cheese manufacture.

Netherlands. During the COVID-19 pandemic, there were two lockdowns at primary and secondary schools, followed by online education. Later in the year, schools were allowed to open up at 50% capacity and adopted a form of hybrid education. External visitors were not permitted to enter the schools. Schools, teachers, and students struggled to adjust to online learning at first; and working in groups became more challenging for the pupils during hybrid classes. Online meetings, phone conversations, emails, and the Teams app were used to communicate with all the schools. It was especially challenging for the teachers to keep track of the students' progress on the project. Furthermore, societal actors were reluctant to co-operate with entities outside their organizations, while simultaneously refusing to participate in an online capacity. Potential societal actors also stated that they had no time in their schedule to engage in a LL project owing to the COVID-19 pandemic and all the issues that came with it. Thus, recruiting societal actors proved to be the most challenging stage for all the pilot schools, yet several of them were successful. Furthermore, to reduce the threshold for possible societal actors, expectations regarding societal actors' involvement were lowered.

France. In the past year, France has had multiple lockdowns involving online learning and hybrid classes, with extremely strict protocols in place. It was extremely difficult to involve schools in the SALL project since it was obviously not a priority for teachers and directors, while battling to keep their students interested and focused on online classes. As a result, the majority of schools contacted were interested in participating in the project, but only for the next school year (2021–2022). The two schools that were interested to participate during the pilot phase faced other obstacles (i.e., change of teaching staff during the year, floods) which prevented them from engaging. Online meetings and emails were used to communicate with the participating schools. Due to entry restrictions in schools and limits in available digital tools, societal actors' active engagement in school initiatives was limited.

Israel. Prior to the pandemic's breakout, Israel contacted several schools to invite them to join the SALL project; but, during the COVID-19 crisis, schools found it difficult to carry out the project's initiatives. Numerous teachers described the situation as frustrating, since they were unable to fully engage students in the project. The schools were open for the final two months of the year, which allowed them to concentrate on the project. Certain initiatives that were planned to take place outside the school were unable to take place owing to intermittent lockdowns. Additionally, recruiting societal actors was challenging owing to the difficulties of arranging meetings and the school year's inherent irregularity. As a result of this circumstance, schools were unable to complete their projects. To encourage schools to

continue working on the project and to avoid dropouts, a concerted effort was made to maintain contact with them. Furthermore, alternate methods of doing such school projects were explored, including distance learning. For some schools, it was necessary to reduce the scope of the initiative they had envisioned - either in terms of duration or content. One school was asked to extend their deadline and continue their work throughout the summer holiday (after the students agreed).

Spain. Schools in Spain were required to combine face-to-face and online instruction during the pilot year of SALL. Additionally, the students operated as bubble groups, which meant they were unable to engage with external entities or with students from other groups. Since face-to-face meetings and collaboration with societal actors were made impossible, all communications took place online. The pandemic created significant stress for teachers, who were forced to abruptly alter their instructional practices owing to their groups' isolation. As a result, teachers did not have adequate time to implement the SALL methodology or to distribute the questionnaires and were instead focused on the planning phase. The NCs hosted an online event between teachers and representative societal actors involved in the food system in order to facilitate collaboration. The virtual meeting benefited schools by allowing them to identify a problem which could be addressed by the students and initiated an open dialogue with societal actors. Additionally, NCs tried to maintain contact with the schools via email, phone calls, and virtual workshops. These sessions aided teachers in advancing their approach despite the challenges associated with the Covid-19 pandemic.

Greece. The COVID-19 pandemic had a significant impact on school operations in Greece for the school year 2020-2021, as students were subjected to a series of lockdowns in addition to distance education. When students returned to school at the end of the school year, restrictions were imposed, including the cancellation of field trips, visits, and extracurricular activities. The majority of LL related activities took place remotely, particularly in the early stages; but as students returned to their schools, significant face-to-face activities continued until the end of the school year. This was the time during which schools made greater strides, albeit they were not able to complete a full LL cycle. Many students had difficulties during the early stages of online education owing to constraints in technological infrastructure and/or a lack of assistance or technical abilities at home. Additionally, online engagement was judged to be lacking, frequently resulting in difficult-to-follow and ineffective lessons. These circumstances created ambiguity and prompted schools and teachers to exercise caution in designing and implementing stages of the project. Communication with societal actors was also quite challenging, due to the restrictions and limitations enforced by the pandemic. To support and encourage teachers to participate in the SALL pilot, Greece's NCs utilized email and videoconferencing to communicate, reassuring them that any feedback and experiences gained would be extremely important and valuable. They also tried to provide concrete ideas

for adjusting their projects to the restricted conditions, e.g., by adapting the objectives and by using online collaboration tools. Communication took place with each school individually as well as by bringing schools together in virtual meetings where teachers shared experiences and ideas.

3.2. Data analysis

In the following sub-sections, the data analyses followed for each evaluation tool are described:

3.2.1. Analysis of the case study reports

Each NC provided one case study report for each of their focus school following the template and the protocol of conduct provided in the D5.1. Evaluation Framework. Examples of one case study report per country are provided in Appendix 6.1. In total, 40 case study reports of school projects were provided.

In order to identify whether commonalities existed between the different actions implemented by schools during their SALL school project, the constant comparative method was employed. Three researchers of the UCY team participated in the coding process and consensus was reached after discussion was needed (e.g., when different codes were used for describing the actions a school took during their project). After the initial coding, the school projects were categorized based on their starting point and the subsequent critical steps followed (in terms of achieving their end-goal of identifying possible solutions). The number of LL school projects belonging in each category was calculated to identify the most common pathway(s) followed by schools, as well as the number of societal actors involved and their level of involvement in each pathway. The LL pathways were identified as a means to showcase the different - and most common - ways schools implemented the SALL methodology, especially at the initial stages of their projects. These LL pathways can become exemplars of practice for future open schooling projects following the LL approach. Also, a rubric was created for collecting information about other aspects of the SALL school projects (type of prototypes developed, ways of testing the prototypes, etc.).

3.2.2. Analysis of students' questionnaires

The two students' questionnaires were administered before the start and at the end of the schools' projects in paper-and-pencil or online format (google forms or LimeSurvey). An excel template was developed for NCs to enter the pre and post data per student and questionnaire.

The IBM SPSS Statistics 27 software was used for performing the statistical analyses using only the responses of students that filled in both the pre and post questionnaire to be able to identify whether students changed their science attitudes and civic engagement during their participation in the project. For the Civic Engagement Questionnaire, the pre and post score of each student was calculated based on the responses to all the items. For the Science Attitudes Questionnaire, the final pre and post score of each student was calculated for each dimension based on the responses to the items related to each of the six dimensions (i.e. intrinsic motivation, career motivation, self-determination, self-efficacy, attitudes towards practical work in science and attitudes towards science outside of school).

The quantitative treatment of the data included parametric tests. Paired-samples t-tests were performed to identify whether students' civic engagement and science attitudes changed from pre- to post-questionnaire. One-way ANOVA tests were performed to identify whether the gender of students or the LL pathway followed during the school project had an effect on their post-score in each of the dimensions of the questionnaires.

3.2.3. Expectancies and Impact SWOT analysis

Each NC provided one SWOT per focus school in the beginning or during the implementation phase of the project and one Impact SWOT at the end of each school project according to the guidelines provided in the D5.1. Evaluation Framework. An integrated synthesis of all Expectancies SWOT and all Impact SWOT that were collected at country level was created for each country to summarize the data available. Meta-analyses were then performed to identify the main trends across all countries in terms of Strengths-Weaknesses-Opportunities and Threats posed by the participants before (Expectancies SWOT) and after (Impact SWOT) the implementation of the school projects. More specifically, open coding techniques were followed for categorizing all the statements per participants' level (i.e. teachers, school, societal actors) and dimension (S-W-O-T). Participants' feedback and reflections embedded in the case study reports were used for triangulation purposes. Three researchers of the UCY team coded the data and consensus was reached after discussion when needed. Finally, the frequency of statements clustered in each category was calculated to identify the most dominant categories per level and dimension.

4. Findings

The findings of the SALL project's methodology evaluation of pilot year of the project (year 1) are presented in this chapter. Specifically, the results yielded from each evaluation tool are presented in different sections and all the findings are synthesised in the last section to present the major conclusions of the evaluation and to make suggestions and recommendations for the implementations of the wider community, as well as to entities interested in implementing the SALL methodology in the future.

4.1. Demographic information of the participants of the evaluation procedures of the pilot year

Based on the information gathered through the evaluation procedures of the SALL project, an essential aspect of the LL methodology- which refers to the **participation of a variety of societal actors** within a SALL school project - was achieved. According to the figures that are presented below, teachers from different subject domains, administration staff of the schools, external societal actors of the local community, and students participated in the context of the projects undertaken in all partner countries. We provide below demographic information about the participants of each participatory level.

In Figure 2, the professional background of the participating teachers is presented:

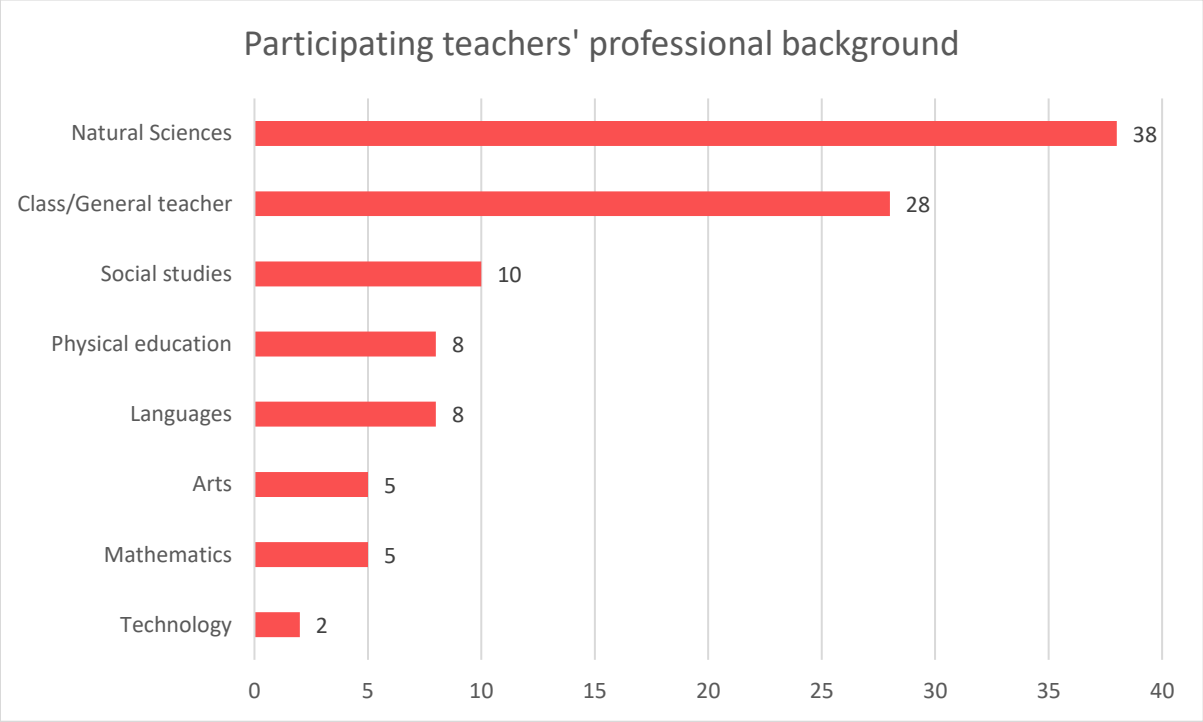


Figure 2: Teachers' professional background who participated in the SALL project (this data was retrieved from the case study reports)

In total, **104 teachers teaching a variety of subject disciplines participated in the project**. The majority of the participating teachers were Natural Sciences teachers (e.g. Biologists, Physicists, Chemists etc.) and class/general teachers (teachers teaching a variety of subjects, mainly primary school teachers). A lot of them collaborated with teachers from other disciplines (e.g. languages, arts, social studies) during designing and implementing the school project.

Staff members with different administrative roles in the school (presented in the figure below) were also involved in the school projects.

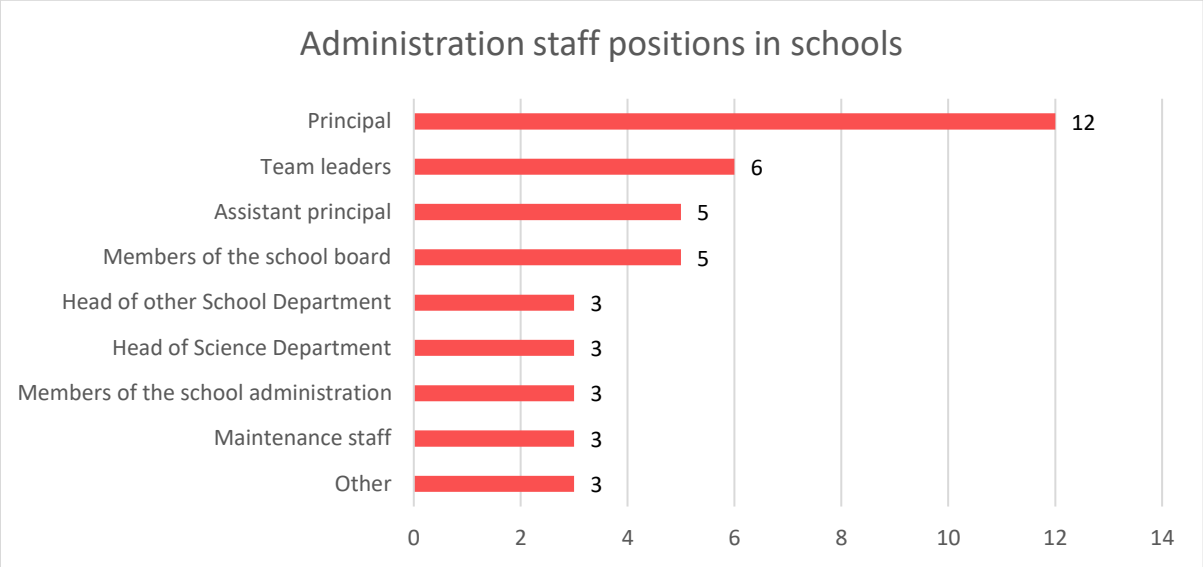


Figure 3: The administrative roles of the staff participating in the SALL project (this data was retrieved from the case study reports)

In total**, 42 members of the administration staff were involved** in some way in the school projects. A lot of principals were involved in the projects, as well as team leaders, assistant principals and members of the school board. Based on the case study reports and the SWOT analyses, **the main role of the school staff was to support practical aspects of the projects during their implementation**, through networking, providing resources, and infrastructure, motivating team work etc. Of course, some administration staff was engaged in the projects more actively. For example, a principal contributed on suggesting ways in which the LL can be incorporated in school actions and others helped in defining the thematic area of the project and explored possible societal actors' collaborations. Furthermore, a principal participated in the refinement of the solution based on the students' pitching idea, some members of the school board generated ideas

for solutions, and in a school, a maintenance staff member provided feedback for the prototype (school garden) as an expert.

As far as the type and number of societal actors participating in the school projects is concerned, Figure 4 involves this type of information, followed by a brief elaboration of the presented data.

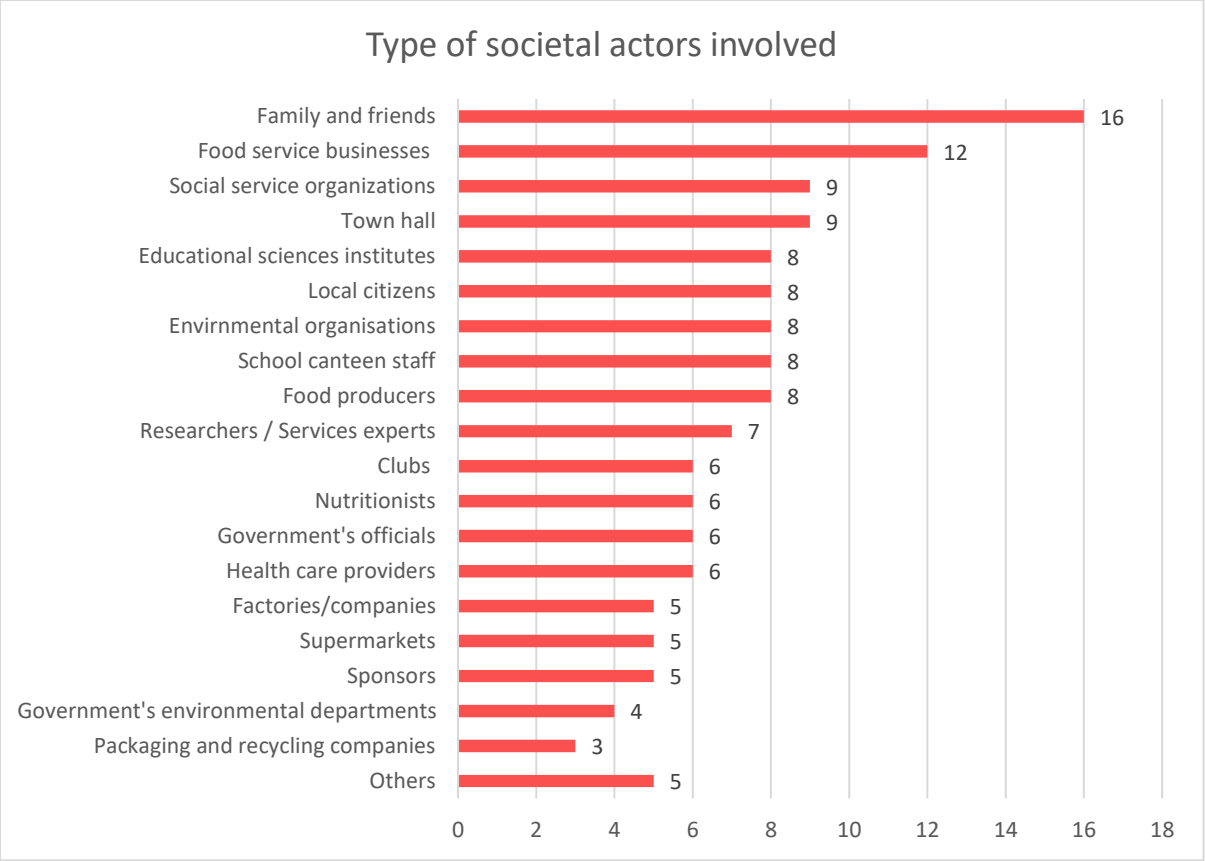


Figure 4: The type and number of societal actors involved in the school projects (this data was retrieved from the case study reports)

In total, **144 societal actors from different fields and backgrounds participated in different ways** (see Section 4.2.3 for details) in the schools' projects. The societal actors involved in the projects were either people/organizations directly involved in the project as participant(s) of the school LL or they were directly related to the topic the project was tackling (e.g. as users or testers of the prototype developed in the course of a project). Family and friends (e.g., students' parents, parents' and guardians' association) were the most common societal actors participating in the projects, along with businesses related to the food industry (e.g. restaurants, cafés, cooks). As seen from the figure, most actors were related to the food system industry and specifically with the production and processing (e.g. factories, local producers (farmers, animal breeders etc.), packaging companies (related to production, recycling etc.), as well as the consumption aspect of the

system (e.g. restaurants, supermarkets, grocery stores chain, stores selling organic products, etc.), school canteens. Also, since most of the projects related to social aspects of the food system as well (e.g. improving the health habits of students, raising awareness about environmental challenges, etc.), a lot of societal actors associated with these aspects were involved (e.g. town hall staff, the mayor), youth clubs (scouts, gardening club, etc.), environmental organizations (eco-NGOs, organizations promoting zero waste lifestyle, etc.).

Based on the demographic information obtained through students' questionnaires, in total **610 students participated in the evaluation process** of the project. It is noted that the demographics of the students presented in the two figures below concern the students that consent from their parents/guardians was provided for participating in the evaluation procedures of the project.

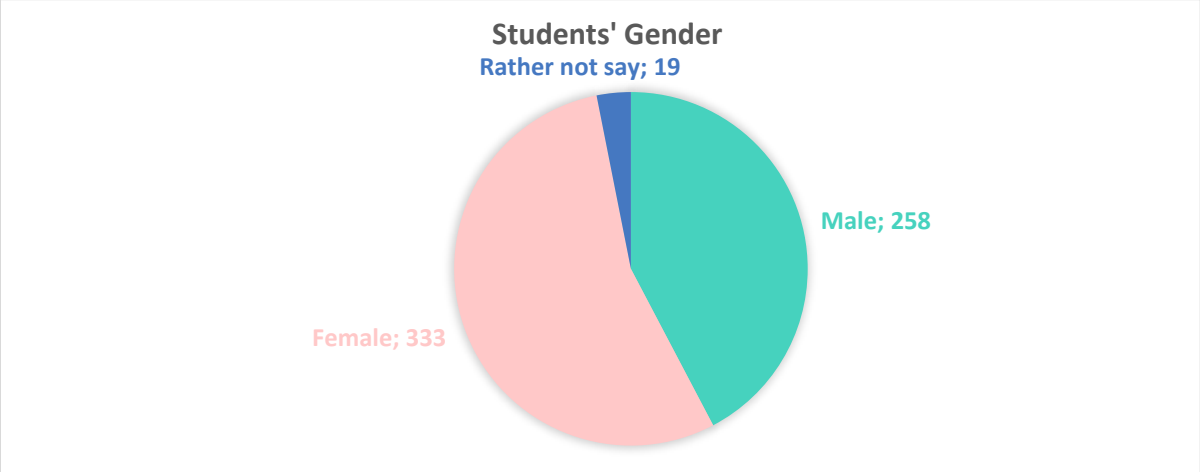


Figure 5: The gender of students participating in the evaluation procedures of the project (this data was retrieved from the students' questionnaires)

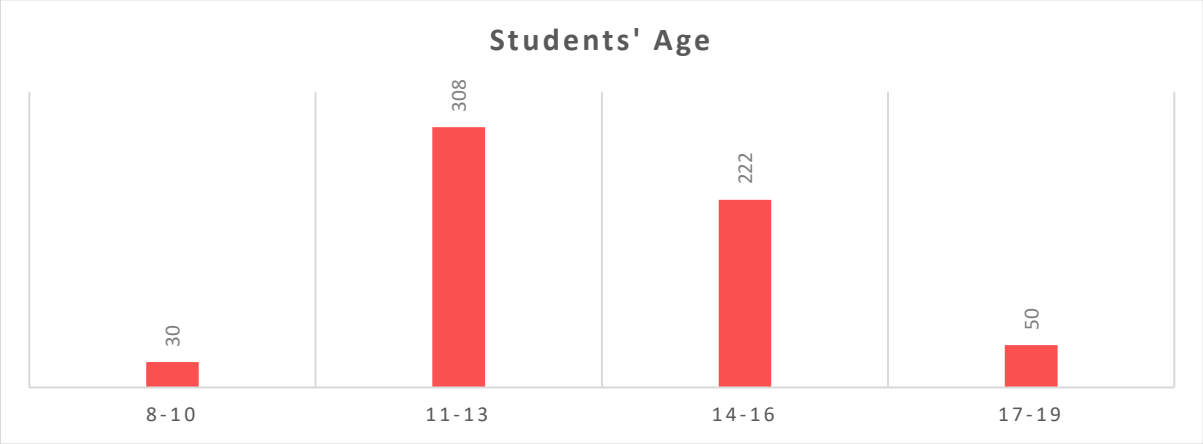


Figure 6: The age of students participating in the evaluation procedures of the project (this data was retrieved from the students' questionnaires)

Most students participating in the project were females (n=333) but nevertheless, an almost equally large number of male students participated as well (n=258). Also, students from Primary up to High School participated in the first year of the SALL project and most of them were Middle School students. Specifically, most of the participating students were 11-13 years old (n=308).

4.2. Results from the case study reports: An Exploration of the Living Lab pathways followed by schools

In the following sections we present the results of the case study reports analysis. Participants implemented the SALL methodology (see Section 2) following different steps and approaches, based on their school contexts, their interests, opportunities and obstacles encountered during different stages of their SALL school projects. In the following sections, we present the different stages participants followed for developing a SALL school project, along with suggestions for future implementations, from the planning process (phase 1; see Section 4.2.1) to the prototyping stages (phase 2; see Section 4.2.2), as well as information on the level of involvement of societal actors (see Section 4.2.3) at different stages of the projects.

4.2.1. Developing a SALL school project: The planning stages (phase 1)

The case study reports' analysis enabled the identification of ten categories of topics the participants chose to deal with during their SALL school projects in school and/or community settings (see Figure 7).

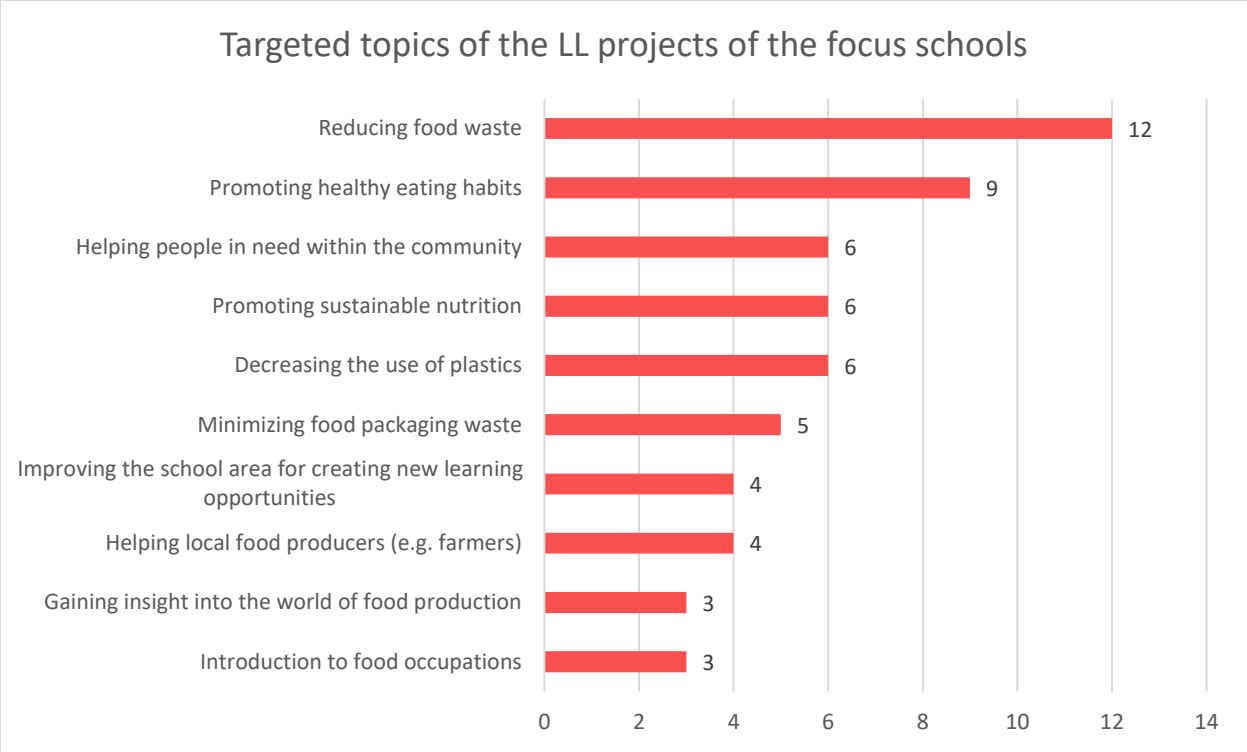


Figure 7: The targeted topics of the SALL school projects of the focus schools

In total, **the focus schools identified ten food system related topics in the school/local community they wanted to target and provide solutions** for during the first year of the SALL project (see for example, Figure 9). It is noted that some SALL school projects combined some of these topics. **The most common topics targeted were the reduction of food waste** (primarily within the school) (e.g., reducing food waste in the school canteen before and after lunch, collaborating with local supermarkets to reuse expired canned food and unsold fruits and vegetables) and the promotion of healthy eating habits (e.g., reducing sugar consumption, raising awareness for misleading publicity of food). Other frequently targeted topics concerned offering help to people in need within the community (e.g., managing food warehouse for underprivileged families), the promotion of sustainable nutrition (e.g., gaining insight on sustainable and environmentally conscious food through preparation of sustainable lunches for others), and the decrease of the use of plastics (e.g., decreasing the outdoor use of disposable utensils, see Figure 8).

Figure 8: Participants; observations in the community for discovering topics they could target

Figure 9: Meeting where the school community discussed problems and solutions in detail

In order to resolve (or provide suggestions for resolving) these topics, the LL participants followed specific actions during the planning stages of their project. Specifically**, five LL pathways followed by the focus schools were identified** from the analysis of the case study reports. These LL pathways are as follows:

1. Gradual exploration LL pathway
2. Single-step exploration LL pathway
3. Pre-defined thematic area LL pathway
4. Pre-defined thematic area and topic LL pathway
5. Pre-defined thematic area, topic and solution LL pathway

Each LL pathway represents a process that led schools to the identification of possible solutions which were then tested or could be tested by the participants. The pathways are **distinguished based on the level of openness of the process followed at the planning stages** of the project (see Figure 10); from the provision of pre-defined key aspects of the project (i.e. pre-defined thematic area[1] and/or topic[2] and/or solution[3]) to open explorations (gradual or single-step exploration).

[1] Thematic area: a general subject of interest related to the food system (e.g. recycling)
[2] Topic: a certain problem, related to the thematic area, concerning the context of the local community (e.g., there are no recycling bins available in the area of the school)
[3] Solution: a service/product that could improve or solve the topic (e.g., placement of recycling bins in key areas of the school and inform students and staff about this action)

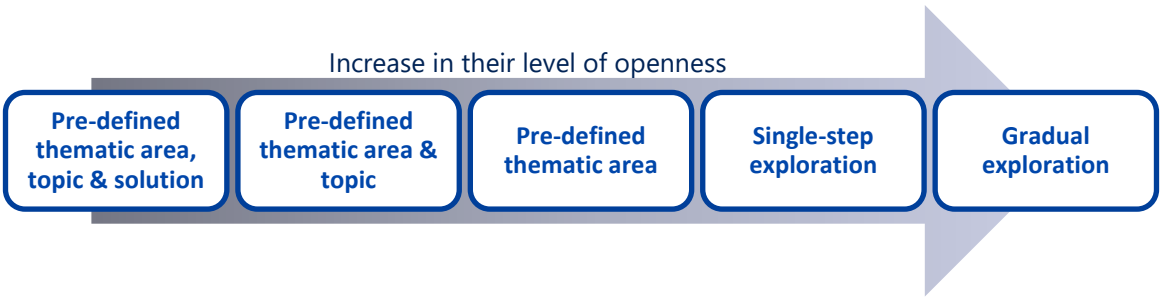


Figure 10: Representation of the LL pathways based on their level of openness (from close-ended to more open approaches)

The process schools followed during each LL pathway are graphically presented in Figure 11 and described below. The y-axis of Figure 11 presents the type of action/activity (i.e. what) a stage of the project could entail and the x-axis presents the stage of the project during which one of the actions took place (i.e. when; in what order each action was implemented).

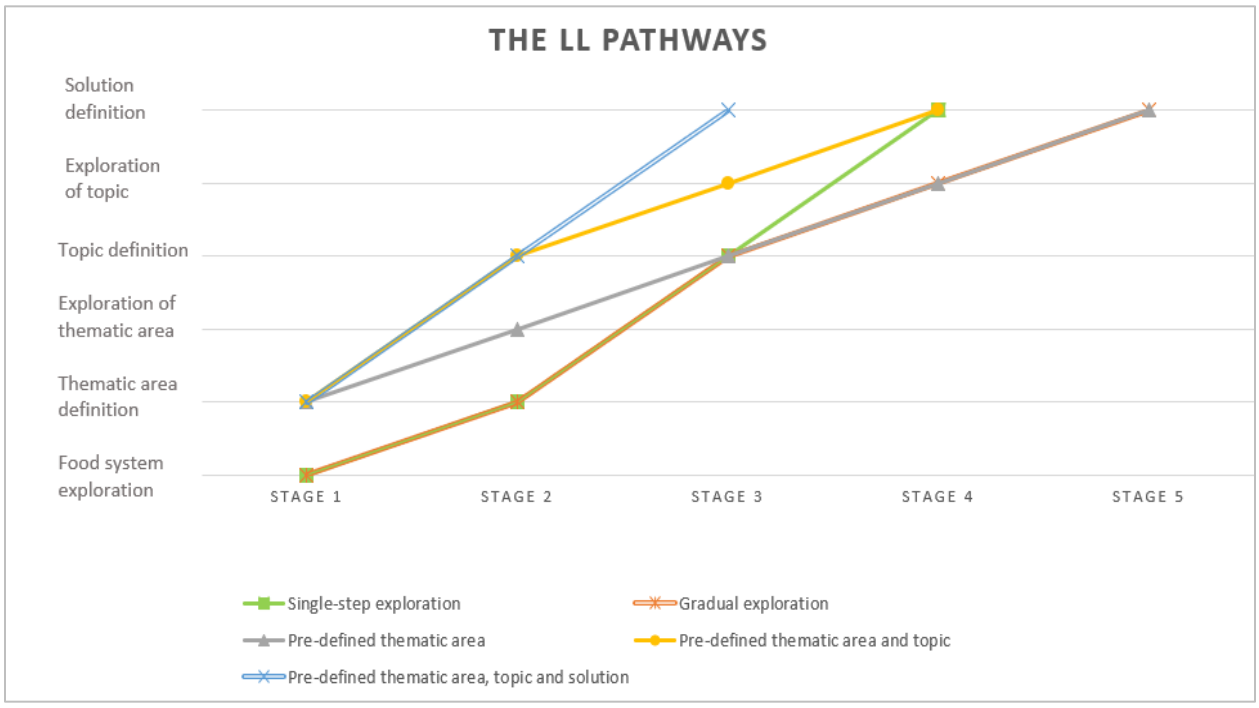


Figure 11: The actions implemented at different stages of each type of LL pathway

Each LL pathway includes a number of actions that participants implemented during their school projects at different stages to then test their solution(s). Below, we describe the actions included in each LL pathway, along with an example of a school project following each process.

1) Gradual exploration

In this pathway, the "food system exploration" action takes place at the beginning of the project for discovering different thematic areas and topics. Then, a thematic area is selected which is then narrowed-down for selecting a specific topic (i.e. «thematic area definition" and "topic definition" actions). In contrast to the Single-step exploration pathway, participants implement an additional exploration of the specific topic that they will target (i.e. "exploration of the topic") before suggesting different solutions.

Project example: "Urdaneta School" in Spain

Food system exploration: At the beginning of the project, students reflected on all the processes involved in the food chain and identified food-related problems in their daily lives.

Thematic area definition – Topic definition: Following this process, they selected the thematic area of their project: Nutritional habits and packaging waste used by the students

Exploration of the topic: Students monitored the mid-morning and mid-afternoon snack (see Figure 12) with the Scratch software (see Figure 13) for two weeks and checked the packaging in which it was brought in. Specifically, students recorded what they brought for lunch and what packaging they used and then transferred the data to a google form. Once the data was collected, they created an app using the Scratch software, in which, by entering the data on the type of food and packaging, the software itself analyzed whether the food was healthy or not, and whether the packaging was environmentally friendly. After the survey, they reflected on how to improve and find out about new healthy snack proposals and how to reduce the use of plastic packaging.

Figure 12: Photos from the exploration and monitoring process of packaging snacks used by students

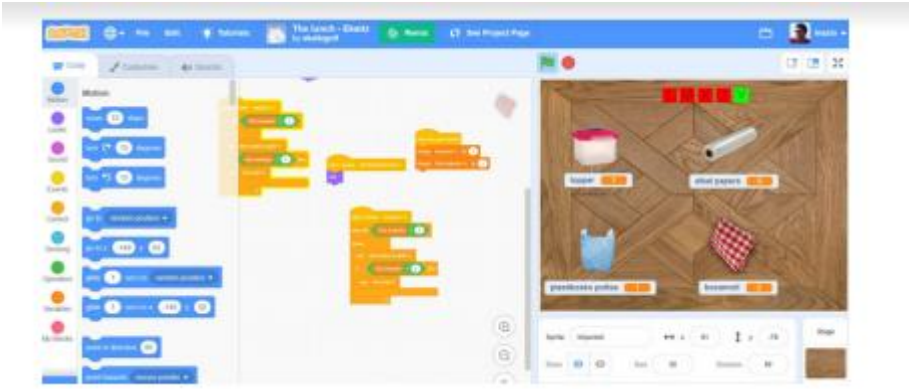


Figure 13: Screenshot of the Scratch program created by students

Solution definition: A school-wide campaign was planned to raise awareness among all students about healthy lunches and the use of reusable and environmentally friendly packaging.

2) Single-step exploration

As in the gradual exploration pathway, an exploration of the food system concept takes place at the beginning for discovering different thematic areas, topics and solutions the participants can work on ("food system exploration" action). The difference with the gradual exploration is that at this stage the participants of the LL do not do explore the topic further (i.e. "exploration of the topic" action) but they move directly to the definition of the thematic area, topic and solution, as a result of the initial exploration.

Project example: "CSG Jan Arentsz, Alkmaar" school in Netherlands

Food system exploration: The class teacher and the students worked on finding societal actors to participate in their project. They did this by contacting potential societal actors via email and telephone. During the brainstorming, the students gathered a long list of ideas of products or services they could create within the food system theme. Input from the societal actors was used in making this list.
Thematic area definition – Topic definition – Solution definition: The participants then narrowed the list down to options that they thought could best be realized within the time that was available for the implementation process of the project. By combining these ideas, they arrived at their final idea: making an app that educates people on how to reduce food waste.

3) Pre-defined thematic area

In this pathway, the thematic area is provided at the beginning of the project by the teacher ("thematic area definition" action). An exploration of the thematic area then takes place for discovering different topics specified based on the context of the community and/or the school (i.e. "exploration of the thematic area"). After this exploration, a topic is selected which is further explored, a process which leads to the definition of the solution.

Project example: "Escola Básica Pedro Jacques de Magalhães" in Portugal

Thematic area definition - Exploration of the thematic area: At the beginning of the project, the teachers introduced the theme of food systems and in particular the problem of food waste at school, to the students who attend the school's science club. Following this introduction, students decided to monitor the school canteen for a week, in order to identify any problems related with food waste.
Topic definition: Students identified the following problems in the one-week observation of the school canteen: 89 kg of food (main dish) was not consumed (from the plate to the waste), 51 kg of soup was not consumed (from the plate to the waste), 8% of the meals were not consumed (meals that were booked but students did not attend), there was no separation between organic and other waste and only 20% of students consume fruits at lunch.

Exploration of the topic: The students organized a World Café (see Figure 14) with the presence of several societal actors, identified by teachers and students, that were linked to the problem of food waste: representatives of the school board, representatives of parents' association, representative of the City Council (Educational and Environmental Department) and of the local Parish. The project was discussed among all participants with the purpose of finding solutions for the identified problems.
Solutions definition: The following solutions were outlined: to adjust the quantity of the food on the plate, to create a fruit take-away spot with the fruit that was not consumed during meals, to separate organic waste from other residues and to raise awareness for the food waste problem among all school community.


Figure 14: World Café with the presence of societal actors

4) Pre-defined thematic area and topic

In this pathway, the thematic area and topic are chosen in advance by the teacher ("thematic area definition" – "topic definition"). Then, the participants explore the thematic area and topic for suggesting different solutions ("exploration of the topic"). Finally, one of the suggested solutions is selected in order to proceed with its implementation ("solution definition").

Project example: "ORT Danciger" in Israel

Thematic area definition – Topic definition – Exploration of the topic: The aim of the project was to develop a biotechnological product for benefiting the beekeepers' community and the general public. The students learned a lot about bees and hives, including the way they affect our world and their tremendous significance to the environment and to our lives. This was mostly theoretical work that served as a background for the next stage. Also, they went for a school trip to see hives, guided by one of the beekeepers from the community. The students learned about some of the scientific aspects of honey production, but also about the economical and industrial sides, in Israel and abroad. The beekeepers presented them the process of developing a business in this field.
Solutions definition: The students divided into five teams worked as a "business company", producing its own product. The different products were defined by the students in each team, according to their interests.

5) Pre-defined thematic area, topic and solution

In this pathway, the thematic area, topic and solution are provided in advance ("thematic area definition – Topic definition – Solution definition") and participants proceed to the implementation of the solution.

Project example: "The International School of Paphos" in Cyprus

At the initial stages of the planning process, the teacher informed the principal of the school about the SALL project. Together, they discussed ways in which they can include the LL methodology in their already planned actions that were related to the food system. The school set the overall goal for this school year to raise awareness concerning environmental problems (e.g. plastic pollution, food waste) and to promote collaborative work for topics concerning the local community. They wanted to engage all 850 students of the school in some way. Hence, they decided that the best way to achieve maximum engagement would be to propose as a solution the creation of an eco-challenge month during which students could design and participate in different actions that would take place each day. Finally, the teacher introduced the eco-challenge month and the overall aims for this school year to the students who participated in the different challenges and actions in order to raise awareness about environmental problems in their school. For a month, the students worked in cooperation with their teachers, their families and the local community on the implementation of different actions like tree-planting, construction of a metal turtle functioning as a recycling bin, development of a mobile application to minimize food wastage, tasting of fruits and vegetables, sale of ecological products and donation of their garden's products to families in need.

Figure 15: Participants working during the eco-challenge month: Transformation of the school garden

In conclusion, schools followed one of the five LL pathways described above during the initial planning stages of their project which incorporate different actions at different stages. As seen from Figure 16, **there is a rather balanced frequency distribution of the developed LL school projects along the five different LL pathways.**

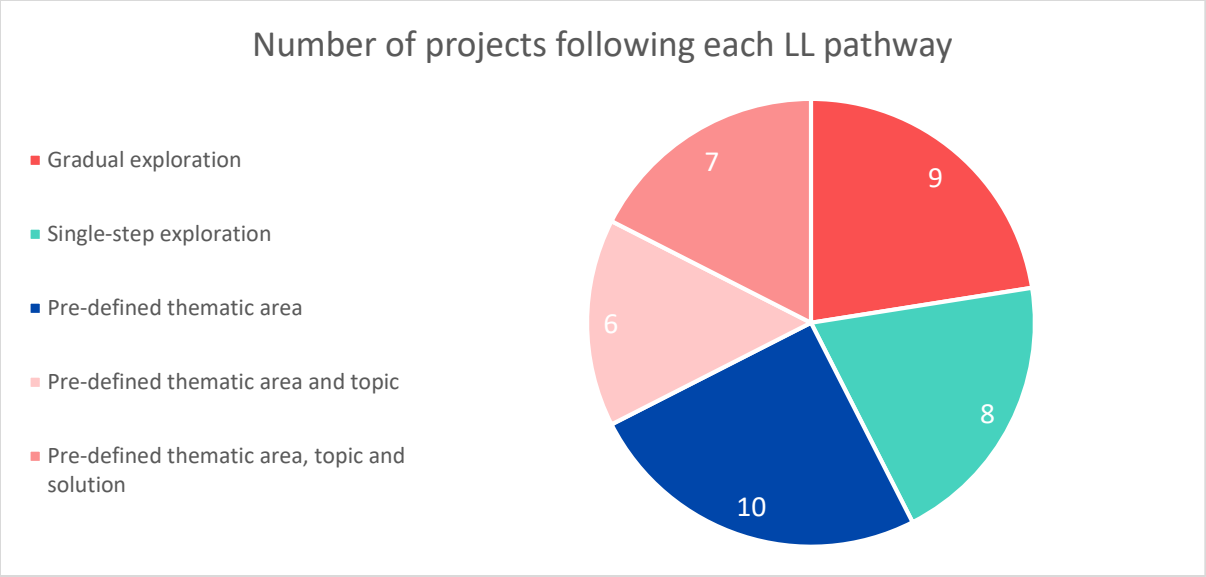


Figure 16: Number of school projects following each LL pathway

The most chosen LL pathway (1/4 of the projects) was the "Pre-defined thematic area" pathway, followed by the "Gradual" and "Single-step exploration" pathways (nine and eight projects per LL pathway respectively). Hence, **most of the schools chose to follow the LL pathways that provided some freedom to the participants for formulating key aspects** of the project by either providing just a starting point (thematic area) or engaging the participants in actions that facilitate the identification of the key aspects.

All LL pathways incorporate three actions which can be considered as milestones: the definition of the thematic area, the definition of the topic and the definition of the solution. These actions take place at different stages of each LL pathway and through these actions the LL participants come to a consensus on what their SALL school project will be about. Also, the definitions of the thematic area, topic and solution mark the initiation of the rest of the actions of the projects which relate to the prototyping, testing and evaluation of the solutions.

The integration of a food system exploration at the beginning of the project (as in the gradual and single-step exploration pathway) leads to the definition of the thematic area, topic and solution. **The "exploration of the food system" as an initial action of the project can be followed by LL participants that do not have the necessary background knowledge and/or experience to define thematic areas and topics they wish to work with.** The involvement of relevant societal actors can facilitate this process. The participants that started their projects with a food system exploration addressed the following questions, which can be used as support to schools that wish to start a similar project in the future, along with other training and support materials developed (see Section 2 for more details on relevant deliverables):

- Which food system related processes are followed in your daily lives or your school or your school?
- Are there any food-related problems/topics in your local community or in your daily lives or in your school?
- Which are some products and/or services related to the food system that could be beneficial in your local community or in your daily lives or in your school?
- Which are the fields of interest for each societal actor that is part of this project or can potentially participate?
- How could the schoolwork connect to the food system and how can it be beneficial for others (e.g. other school staff, students, citizens)?
- How could the school infrastructure connect to the food system and how can it be beneficial for others?

LL participants also used a variety of tools, techniques and processes during the "food system exploration" action, which again can be utilized by future SALL schools. For example, some tools that were used for answering these questions were surveys and questionnaires for the public and some techniques that facilitated this process were brainstorming (e.g. Figure 17), world cafés, debates, creation of a list of ideas and data collection and analysis (e.g. Figure 18). Additionally, LL participants used these tools and techniques in a variety of ways, such as during discussions, activities focusing on reflection, online research, lectures/teachers' lessons and processes having a competitive character (e.g., blind-testing of fruits and vegetables for an introduction, participation in a school competition for voting for the final project, participation in national competitions for developing participants' incentives and inspiration for ideas). The outcome of this exploration stage is the determination of the thematic area and topic and/or solution.

Figure 17: Students brainstorming ideas

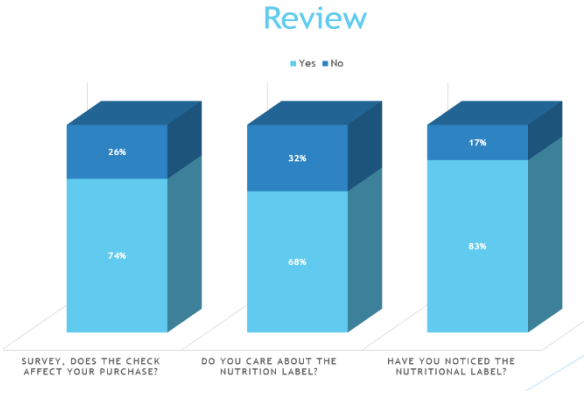


Figure 18: Data collection and analysis of surveys for the public implemented by a school

If participants were unable to identify solutions, they included an additional exploration phase (i.e. "exploration of the topic" action) in order to investigate further their context and define solutions (i.e. gradual exploration pathway). Two examples of common questions addressed by schools during this stage were:

- How can a solution become even more specific to the context of our community?
- How can a solution overcome issues like funding or COVID-19?

A common tool for facilitating this process was the implementation of different types of surveys (e.g. with the use of questionnaires) which were administered to city residents, students' families, academy students, school students, entrepreneurs, consumers, etc. Other techniques were also used during the "exploration of the topic" action, which supported either the collection of data/information about the topic (e.g. observations, laboratory experiments, data collection and analysis) and/or the sharing of ideas and information between different participants (world cafés, interviews, debates, brainstorming, processing of the information gathered using the 'star-bursting' method (a form of brainstorming that focuses on generating questions rather than answers) etc.). The participants generated ideas and gathered information about the topic they wished to target through discussions, gathering feedback, field trips with societal actors, lectures (by teachers or societal actors, see for example Figure 20), workshops (with students, teachers and societal actors participating), research based on students' questions (e.g. Figure 19) etc. The outcome of the "exploration of the topic" action is the determination of the (possible) solution to solve the targeted topic of the school LL.

Figure 19: Students researching their thematic area

Figure 20: Awareness session organized by a school with the presence of societal actors

In the event the teacher (and/or a societal actor) provided a pre-defined thematic area, the actions "exploration of the thematic area" for defining the topic and "exploration of the topic" for defining the solution would possibly take place. In the case the thematic area and the topic were pre-defined, only the action "exploration of the topic" for defining the solution took place. For exploring the thematic area, schools collected and analysed data and observations and/or engaged in reflection activities and literature reviews, as well as presentations, field trips, workshops or discussions with (key-) societal actor(s).

4.2.2. Developing a SALL school project: Putting the plan into practice (phase 2)

After the planning process, schools proceeded with the testing of their identified solutions. Information about the types of prototypes developed by students, the ways they tested them and the participants/users involved in the testing process are provided below. This information can serve as examples of good practice and ideas for schools that wish to follow the SALL methodology.

During the prototyping stage, schools created different kinds of prototypes in order to evaluate the applicability of their solutions, to discover the advantages and disadvantages of their proposed solutions, and to improve them accordingly. **The prototypes the schools created during their SALL school projects were either physical, digital and/or services with real people.** Some schools created more than one type of prototype. As seen in the Figure below, **41 prototypes were created in total**.

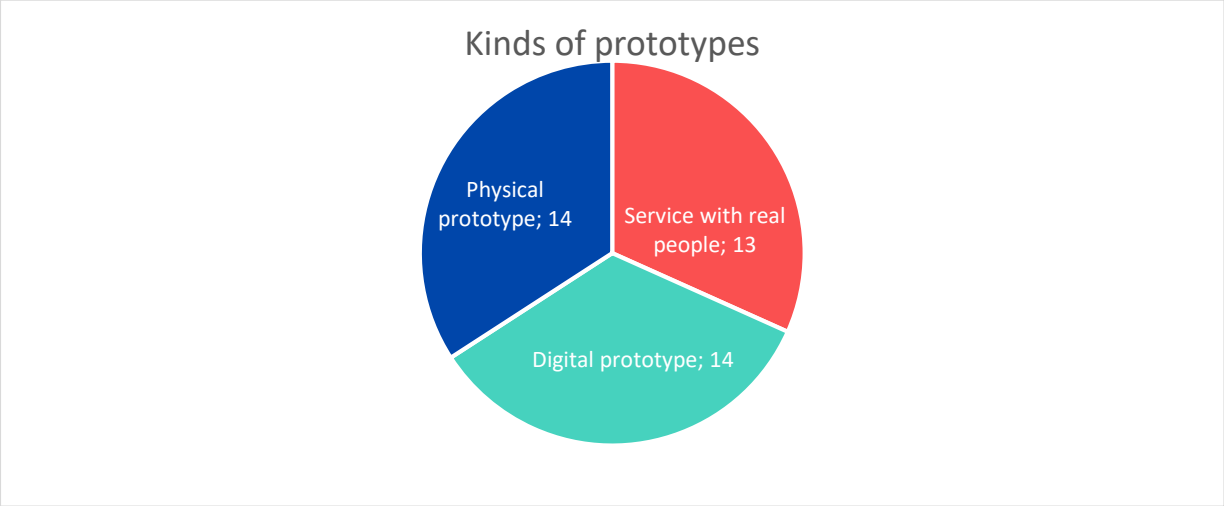


Figure 21: Numbers of prototypes developed per category

Below the type of prototypes developed in each category are presented, as well as pictures of some of these prototypes:

Physical prototypes developed:

- Posters
- Flyers
- Drawings
- Food for lunch
- Sustainable snacks
- Biotech honey products
- Herbs products
- Growth of mushrooms from coffee grounds
- Garden
- Planting boxes for the garden
- Tea garden and drying machine for tea
- Smart irrigation system
- Compost
- Low waste food packaging
- Mathematical formula

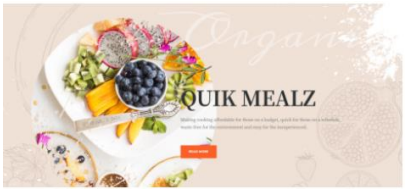
Digital prototypes developed:

- Apps
- Mockup of app
- Website
- Database
- Multimedia resources
- Video
- Digital herbarium with pictures
- Presentations
- Video commercials

Services with real people:

- Development of eco-challenges for students
- Campaign
- Petition
- Lesson
- Workshop
- Consultation from an expert SA to a novice SA to improve the novice SA's situation
- Provision of food for people in need
- Healthy cafeteria

A. Creating planting boxes for the garden



B. Screenshot of a digital app prototype

C. Development of digital herbarium

Figure 22: Examples of prototypes developed by students

Schools tested the applicability of their prototypes in a variety of ways. These ways are presented in Figure 23 below. **In particular, the tests were performed through the sharing of information (most frequent way chosen), through the organization of events and/or the use of the digital or physical prototype.** Some schools performed more than one tests for their prototypes.

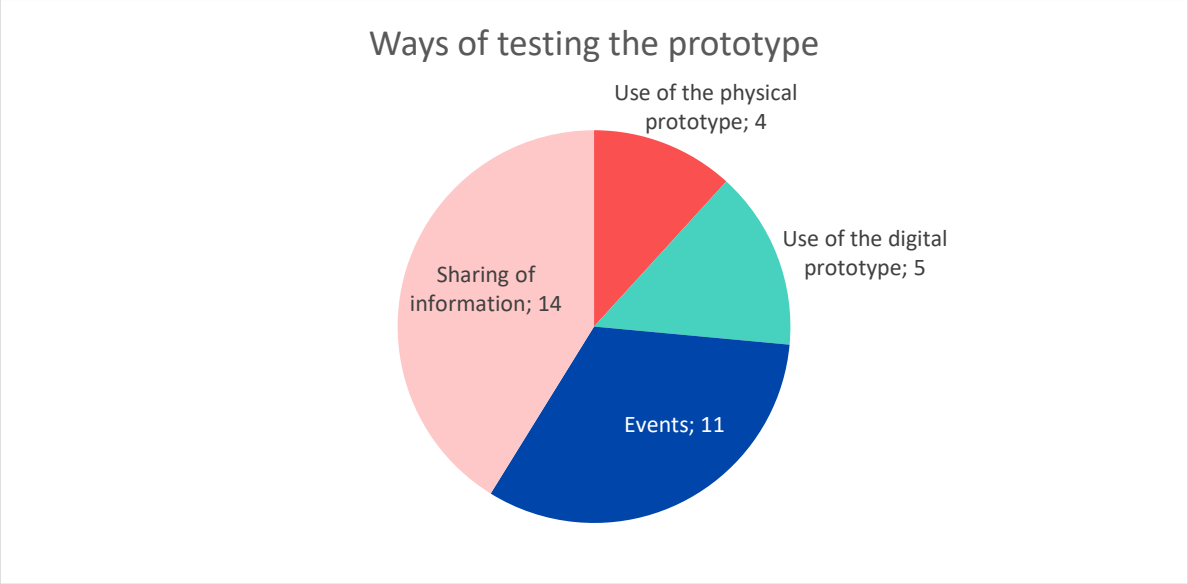


Figure 23: Ways of testing the prototypes

Below, examples and pictures/screenshots of different ways of prototypes' testing employed by LL participants are presented:

Examples of ways of sharing information:

- Through social media
- Social media campaign
- Article
- Sharing of video
- Campaign in school through a music, a puppet show and a stop motion animation
- Placing posters in school
- Lesson taught to school students
- Informational sessions with school students
- Informational sessions in public spaces
- Flyer hanged in the neighbourhood
- Hand out of sustainable snacks to inform people in the neighbourhood about the subject

Sharing of expertise and experiences by expert SAs

Examples of events organized:

- A variety of eco-challenges for a month performed within the school community
- Preparation of lunch
- Initiation of a physical campaign
- Market day (mockup service)
- Conference
- Hackathon
- Lesson with activities integrating the prototype by teachers
- Sign up of a petition
- Camp
- Implementation of activities in a workshop by experts

Examples of ways of testing digital prototypes:

- Users use the app developed
- Users interact with the digital herbarium

Examples of ways of testing physical prototypes:

- Utilization of the garden
- Use of the tea products
- Use of the compost

Participants/users departing from different backgrounds were chosen to help in the testing process of the proposed solutions by providing their feedback (see Figure below). The majority of the

participants/users were students of the school either because the suggested solution was directly related to them or because they were easily accessible (especially due to the restrictions caused by the covid-19 pandemic).

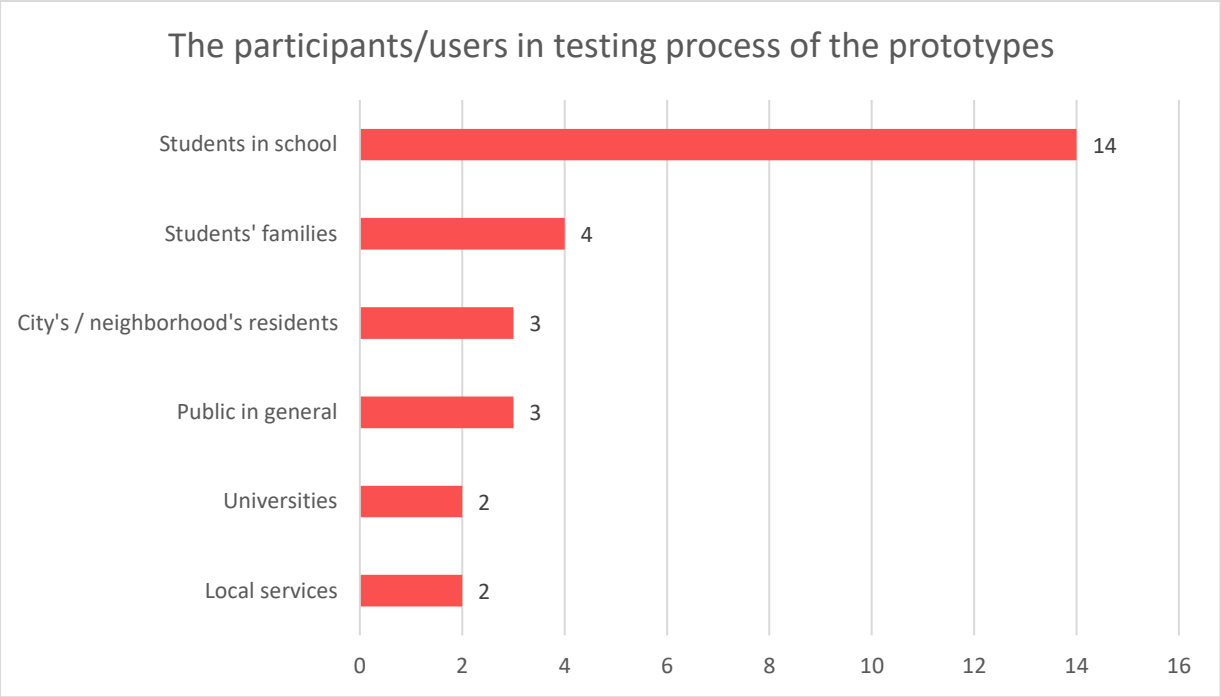


Figure 24: The background of participants/users from which feedback was received during the testing process of the prototypes

For example, students filled out an evaluation form or survey created by the project coordinator, the teacher or other students. Other participants during the testing process were the families of the students, residents of the area, the general public (e.g., people in public spaces, social media), researchers/experts or students working at universities, and people related to local services (e.g., local farmer, entrepreneurs). Participants/users shared their feedback through questionnaires concerning the use and the design of the prototype filled out by public, or comments and remarks about the features and/or the content of the prototype(s) presented.

4.2.3. The level of involvement of societal actors throughout the LL school projects

The societal actors were involved in the school projects in different ways and levels[4]. The analysis of the data collected with respect to societal actors' participatory level yielded **five different levels of**

[4] For more information on the methodology of the project in regards to the engagement of societal actors, see D3.1 and for relevant materials and guidance developed see D3.2.

involvement [5] in the SALL school projects that are described below, **starting from the lower involvement (discovery level) to the higher involvement level (co-construction level).**

Participatory level 1: Discovery

The societal actors learned about the SALL school project (e.g., through emails for recruitment, presentations) at any given point of the project.

Some of the actions that the societal actors were involved in this level are:

- Learn about the school project
- Discuss with the rest of the participants about the project - planning next steps (e.g., future collaboration for prototyping, testing etc.)
- Being informed through school's social media channels
- Participate in events/actions
- Use of the prototype
- Discover new solutions and uses through the solution or prototype presentation

Participatory level 2: Sharing level

The societal actors shared their knowledge and expertise with the participants in the co-creation phase of the LL cycle or provide resources in the exploration phase.

Some of the actions that the societal actors were involved in the "sharing in the co-creation phase" are:

- Identification of problems in the community
- Sharing of information for the thematic area/topic of the project (through world cafés [see Figure 25], field trips, discussions, participation in surveys, lectures, meetings, interviews, workshops, lectures)
- Offering feedback for the thematic area/topic of the project (e.g., opinion about its importance)
- Data collection (distributing questionnaires to the public)

[5] The levels were adapted from the handbook: Inmediants (2014). *Living Lab: A New Form of Relationship with the Public*. Retrieved from: https://www.cite-sciences.fr/fileadmin/fileadmin_CSI/fichiers/au-programme/lieux-ressources/carrefour-numerique/_documents/LivingLab/Living-Lab-English.pdf

Figure 25: World Café for introducing the food system theme in a school

Some of the actions that the societal actors were involved in the "sharing in exploration" level were:

- Listen to students' pitching an idea (e.g., Figure 26)
- Provision of information for the solution/prototype (e.g., discussion, exchange of practices and experiences, participation in a survey, feedback), for example see Figure 27).
- Prototyping (sponsoring money or products, supply of materials, provision of equipment)

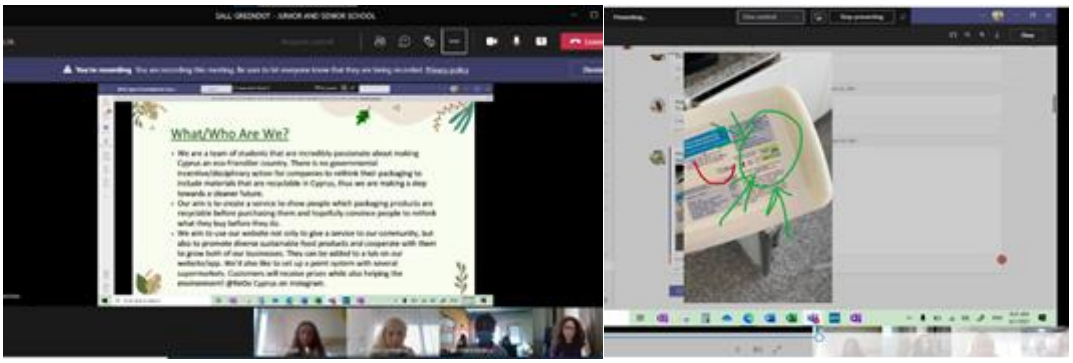


Figure 26: Students pitching their project for initializing a collaboration with a key-societal actor and asking feedback and questions

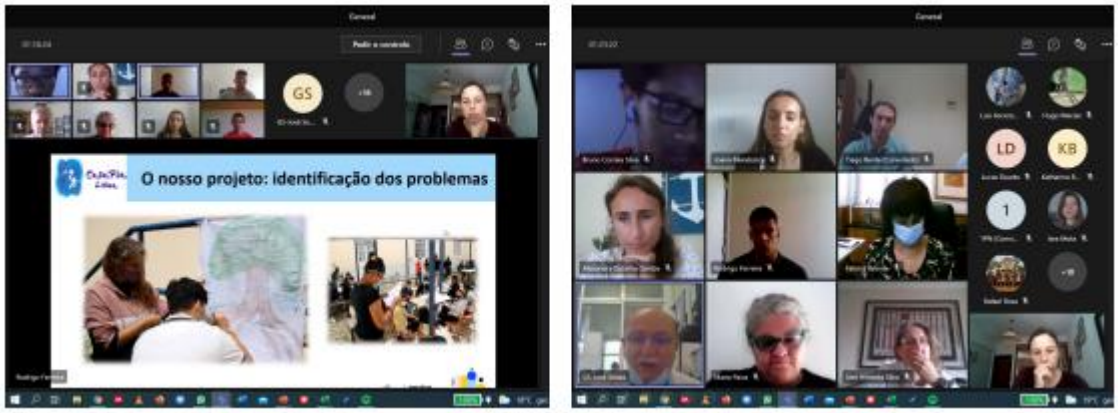


Figure 27: Online meeting with societal actors

Participatory level 3: Testing level

The societal actors participated in the experimentation phase of the LL cycle, either in the design of the testing process of the prototype or in the actual testing of the prototype, as well as in the provision of feedback. Some of the actions that the societal actors were involved in this level were:

- Installation of the prototype
- Sharing of the prototype - advertising the project (e.g., through articles, campaigns, social media, petitions)
- Use of the prototype and provision of feedback

Participatory level 4: Generating ideas level

The societal actors participated in the co-creation phase of the LL cycle for coming up with solutions for the project. Some of the actions that the societal actors were involved in this level were:

- Formulating ideas for solutions for the thematic areas / topics (e.g., brainstorming)
- Provision of feedback for the suggested solution of the issue (e.g., suggestions for improvements to make it more feasible)
- Answering students' questions
- Suggestions for other societal actors

It is important to state that the societal actors who reached this level of involvement were likely to contribute in the "sharing in co-creation" level as well.

Participatory level 5: Co-construction level

The societal actors participated in the prototyping stage (during the exploration phase of the LL cycle) or participated in at least two phases of the LL cycle. The LL phases that the societal actors participated in the different school projects were as follows: co-creation & exploration, co-creation & experimentation, exploration & experimentation, co-creation & exploration & experimentation, co-creation & exploration & experimentation & evaluation. In general, the greater the number of LL phases in which the societal actors participated, the higher their level of involvement in the project was. The societal actors in this level were much more actively involved in the project (e.g., participation in frequent meetings with teachers and/or students and/or other societal actors, working together with the students along the project, from the beginning to the end of the project), doing field work with students).

Societal actors that reached this level participated or implemented some of the actions described in the levels above. Some additional actions that the societal actors were involved in this level were:

- Identification of the main questions or elements to be tested for the solution/prototype
- Developing the ideas for solutions/prototypes (e.g., providing tips for characterizing the solution/prototype and for focusing its objectives, debate about the details of the solution/prototype [e.g., target audience], etc.)
- Prototyping (construction. workshop, mentoring, guidance, discussion of problems)
- Make-athon event
- Hackathon event

In the Figure below, the number of societal actors involved in each level of involvement and LL methodology phase (i.e. co-creation, exploration, experimentation, evaluation) is presented.

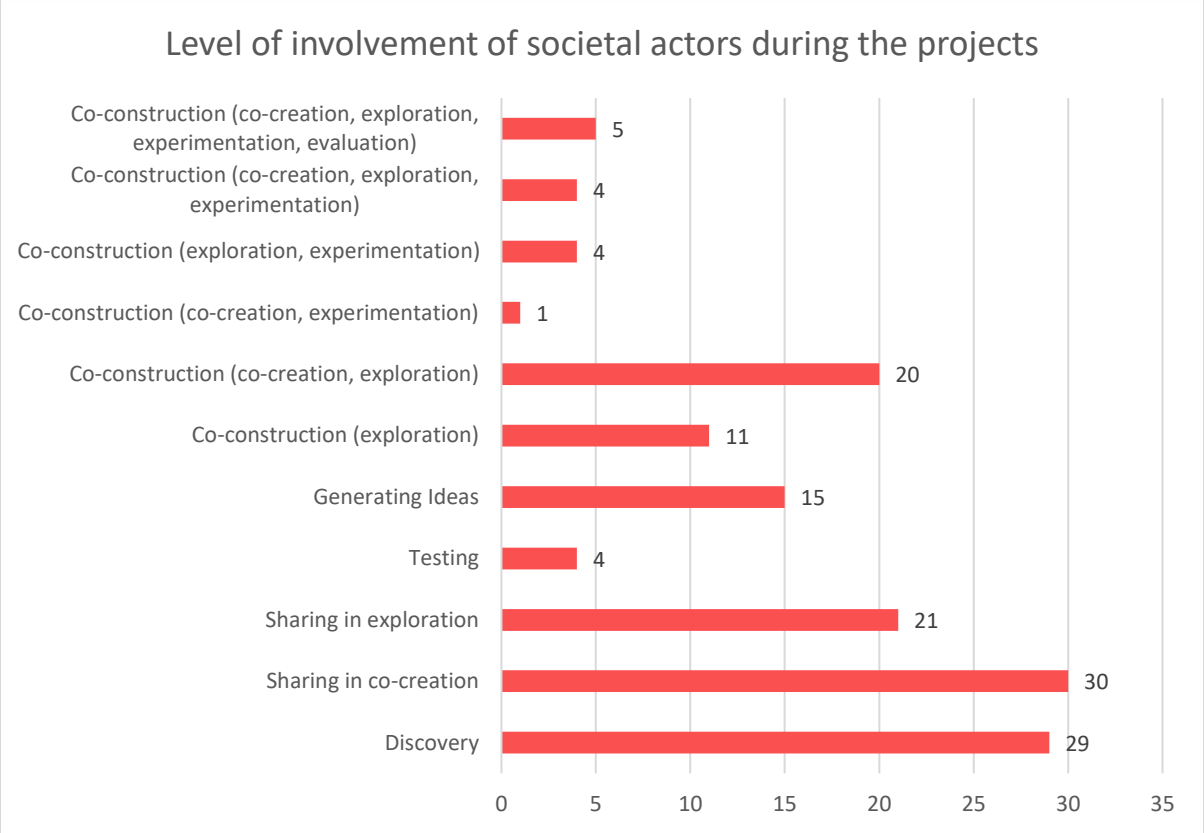


Figure 28: Number of societal actors that reached a specific level of involvement

As it is depicted in the Figure 28, **most of the societal actors had a lower level of involvement in the projects, from the discovery level up to the generating of ideas level**. Apart from the restrictions in face-to-face communication and ability for school visits or field trips, the low level of involvement of most societal actors could be attributed to the fact that all the projects managed to reach the co-creation phase of the LL cycle but not necessarily to move to the experimentation and evaluation phase to finalize their work, and hence the collection of data for the Interim Report for those phases was limited or restricted. The second reason (as it is described in the case studies and in some statements of the SWOT analyses [see Section 4.4]) relates to the struggles some schools encountered in their attempts to engage societal actors in more phases of the LL cycle or for an extended period in an active manner. Nevertheless, there was still a relatively large number of societal actors (45 in total) who reached the higher level of involvement in the project, in the co-construction level.

The pathways that the schools followed also affected the level of involvement of the societal actors. This is depicted in the Figure 29 below:

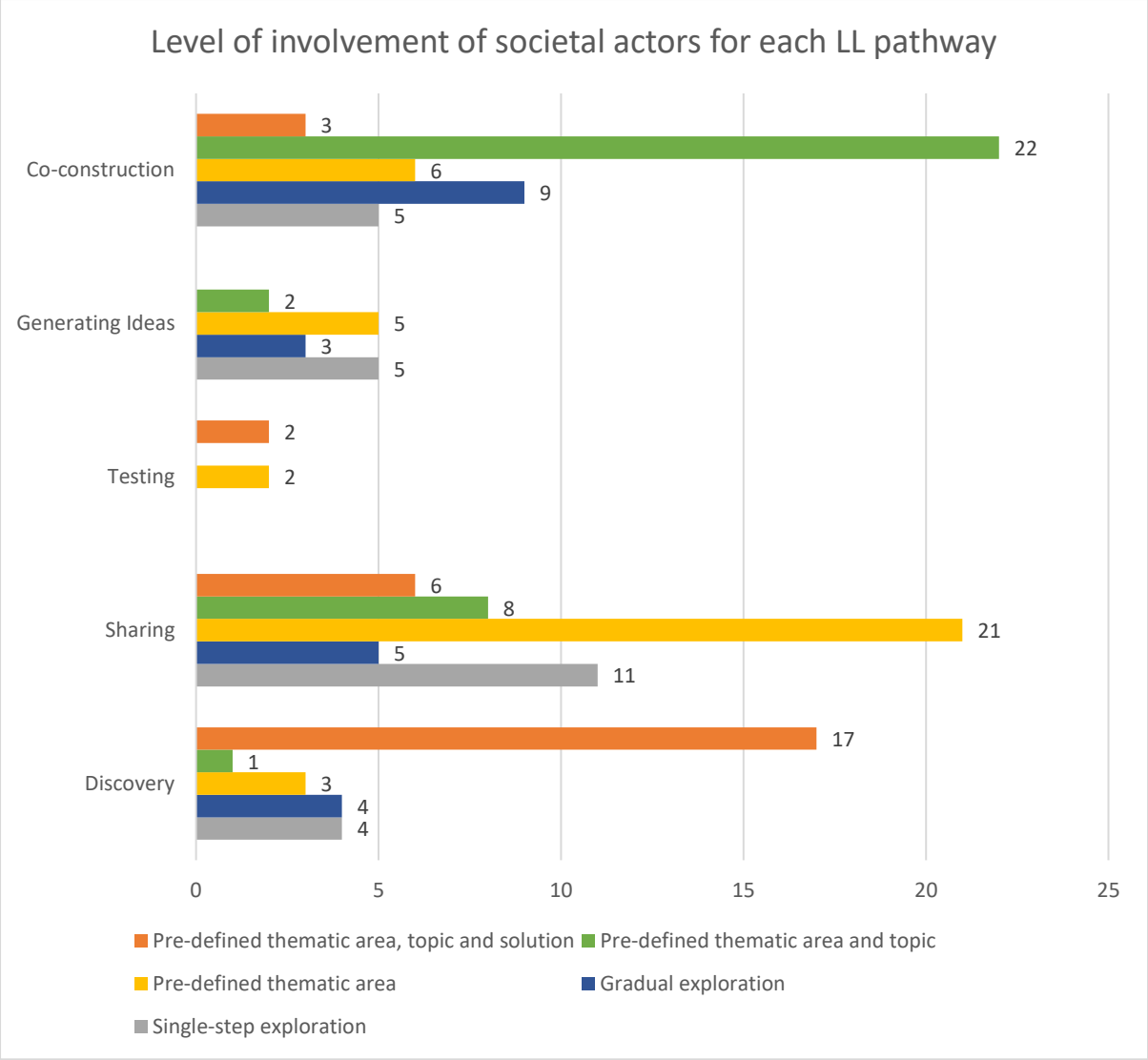


Figure 29: The number of societal actors reaching a level of involvement in each LL pathway

This figure shows that **the highest level of involvement (i.e., co-construction) was reached by the societal actors who were involved in the "pre-defined thematic area and topic" pathway.** This pathway follows a more close-ended approach, with the thematic area and topic being pre-defined by some of the participants (mainly the teacher and/or a societal actor). Therefore, the time and focus of the project was dedicated on the identification of a solution, and the subsequent evaluation of the deriving prototype probably offered the opportunity to recruit and engage key-societal actors interested about the topic and willing to be more involved.

On the contrary, as seen from Figure 29, **the lowest level of involvement of societal actors (i.e., discovery level) was evident in projects following the "pre-defined thematic area, topic and solution pathway".** This perhaps indicates that when a project follows a very close-ended approach

not a lot of opportunities are offered to societal actors to be involved in the project in a more active manner, since all three key aspects of the project defined in advance and hence their support in multiple stages of the project was considered as not necessary.

Furthermore**, the schools that followed the "gradual exploration" pathway managed to engage societal actors mostly at a co-construction level**, probably because their open approach towards the LL methodology offered more opportunities for equal participation, as well as an amplified need for the provision of support by societal actors in multiple stages of the project. **When comparing the two open-ended approaches (the "gradual and single-step exploration" pathways), it appears that in the "single-step exploration pathway" the societal actors mostly participated up to a sharing level of involvement**, whereas most of the societal actors involved in the "gradual exploration pathway" participated in the co-construction level (i.e. highest level of involvement). This contrast could be attributed to the fact that schools following the "single-step exploration pathway" defined all three key aspects (thematic area, topic, solution) instantly, whereas schools following the "gradual exploration pathway" performed one more action (i.e. exploration of the topic) after defining the thematic area and topic of their project for finalizing their solution. Therefore, this additional action might had offered them the opportunity (and/or the need) to identify and involve new societal actors at different stages of the project. In the "single-step exploration pathway", the primary focus was mostly on gathering information and building knowledge at the initial stages of the project for defining all key aspects, and hence, most societal actors were invited to participate in actions included in the sharing level of involvement (e.g. present information related to the thematic area chosen by participants), and a smaller number of societal actors involved in the next stages of the projects.

Overall, it seems that different levels of involvement of societal actors during the school projects were reached at different stages of the project, which were primarily based on the aims/topics each project was targeting, as well as the LL pathway followed. When there was a need during a project for societal actors to reach a high level of involvement in school projects, an additional effort during the definition and exploration of the solution could be made for identifying ways in which the already involved actors (or newly recruited societal actors) could actively participate at this stage.

4.3. Results of the students' questionnaires: Enhancement of students' science attitudes and civic engagement

Paired-samples t-tests were performed for comparing the scores of students before the start and at the end of the schools' implementations in terms of civic engagement and science attitudes (intrinsic and career motivation, self-determination and efficacy and attitudes towards practical work in science and science outside school). The results of these statistical tests are presented in the table below:

Table 4: Results of the pre-post comparisons of students' responses in the two questionnaires (paired-samples t-tests)

Subject domain	Dimension	Test	Mean	SD	t	p
Science Attitudes Questionnaire (n=250)	Intrinsic motivation	Pre	14,71	3,201	-,768	,443
		Post	14,86	3,565		
	Career motivation	Pre	17,01	4,725	-2,090	,038*
		Post	17,63	4,836		
	Self-determination	Pre	17,10	3,930	-2,057	,041*
		Post	17,67	4,203		
	Self-efficacy	Pre	15,27	2,850	,150	,0880
		Post	15,24	3,196		
	Attitudes towards practical work in science	Pre	18,95	4,029	-1,355	,177
		Post	19,30	3,889		
	Attitudes towards science outside school	Pre	16,42	4,550	-1,305	,193
		Post	16,78	4,440		
Civic Engagement Questionnaire (n=233)		Pre	45,26	8,808	,286	,775
		Post	45,10	9,215		

* *for p<,05*

According to the results illustrated in

Table 4, **students' attitudes regarding career motivation and self-determination were found to have been enhanced from pre- to post- evaluation**, since the comparison of their associated mean scores was statistically significant ($p<.05$). Career motivation pertains to learning science as a means to a achieve a tangible end (e.g., Learning science will help me to find a good job in the future), and self-determination refers to the control students believe they have over their learning of science. No statistically significant differences were found between the other dimensions of the Science Attitudes questionnaire.

In addition, the comparison of **students' means in the pre- and post- Civic Engagement questionnaire was found to be not statistically significant**. This could be attributed to the fact that even though students had collaborated with societal actors and the local community and this collaboration was considered as noteworthy by the other participants (based on the SWOT analysis), this interaction was in most countries very restricted due to the covid-19 regulations (more information about each country's context is provided in Section 3.1). Most meetings and interactions of students with organizations and people outside of schools were done through online meetings and emails and thus, face-to-face communication and the mobilization within the community (e.g. organization and/or participation in events) were very restricted or not allowed.

A follow-up One-way ANOVA test was performed for both questionnaires to examine whether there were any differences between boys and girls in terms of their science attitudes and civic engagement awareness after their participation in the SALL school projects. The findings of this test revealed that **gender was not a significant factor affecting the post-score of students in any of the dimensions under investigation** ($p<,05$) for both questionnaires.

Comparisons of the post-scores of students based on the LL pathway their project followed (see Section 4.2 for details) were also performed in order to identify whether the level of openness of the procedures followed during a school project affected students' attitudes and civic engagement. As seen from the table below, the mean post-score for civic engagement for students following **the "gradual exploration pathway" during their projects was the highest** (M=48,51, SD=6,27) and the mean post-score of the students following the "single-step exploration pathway" was the lowest ((M=41,35, SD=8,17).

Table 5: Mean and Standard Deviation of the civic engagement post-score of students, based on the type of LL pathway their project followed

Type of LL pathway	Number of students	Mean	Std.Deviation
Gradual Exploration	37	48,51	6,27
Single-step Exploration	31	41,35	8,17

Pre-defined thematic area	41	45,68	6,16
Pre-defined thematic area & topic	79	44,25	11,47
Pre-defined thematic area & topic & solution	45	45,82	8,96

One-way ANOVA tests were performed for comparing the civic engagement post-scores of students and a statistically significant difference was found ($F_{(4,228)}$ =2,92, p=,02, η^2=,49). Post-hoc comparisons using the Dunnett C test, showed that **only the score of the "gradual exploration pathway" was significantly different from the "single-step exploration pathway".** As indicated from the case study reports, the projects following a "gradual exploration pathway" had a large number of societal actors involved in the projects with some having a high level of involvement (co-construction level; for details see Section 4.2.3) whereas the projects following a "single-step exploration pathway" had a smaller number of societal actors involved and very few of them reached the highest level of involvement.

Comparisons of the post-scores of students based on the LL pathway their project followed were also performed for the six dimensions of their science attitudes. Based on the table below, **students following the "gradual exploration LL pathway" had the highest mean post-score for all the science attitudes dimensions.**

Table 6: Mean and Standard Deviation of the six dimensions of the science attitudes post-scores of students, based on the LL pathway their project followed

Dimension	LL pathway	Mean	Std.Deviation
Intrinsic motivation	Gradual Exploration (n=37)	16,51	2,29
	Pre-defined thematic area, topic & solution (n=46)	15,65	2,49
	Pre-defined thematic area (n=42)	15,36	2,95
	Pre-defined thematic area & topic (n=79)	14,16	4,34
	Single-step Exploration (n=46)	13,74	3,43
Career motivation	Gradual Exploration (n=37)	20,05	3,64
	Pre-defined thematic area (n=42)	18,40	4,02
	Single-step Exploration (n=46)	17,02	4,77
	Pre-defined thematic area, topic & solution (n=46)	17,37	4,40
	Pre-defined thematic area & topic (n=79)	16,58	5,59
Self-determination	Gradual Exploration (n=37)	19,51	3,35
	Pre-defined thematic area (n=42)	17,79	3,86
	Pre-defined thematic area & topic (n=79)	17,43	4,91

	Pre-defined thematic area, topic & solution (n=46)	17,33	3,82
	Single-step Exploration (n=46)	16,85	3,89
Self-efficacy	Gradual Exploration (n=37)	15,92	2,23
	Pre-defined thematic area (n=42)	15,55	2,52
	Pre-defined thematic area & topic (n=79)	15,32	3,73
	Single-step Exploration (n=46)	14,89	3,40
	Pre-defined thematic area, topic & solution (n=46)	14,63	3,18
Attitudes towards practical work in science	Gradual Exploration (n=37)	20,57	2,65
	Pre-defined thematic area, topic & solution (n=46)	19,93	2,91
	Pre-defined thematic area (n=42)	19,79	3,02
	Single-step Exploration (n=46)	18,67	3,73
	Pre-defined thematic area & topic (n=79)	18,44	5,02
Attitudes towards science outside school	Gradual Exploration (n=37)	19,54	2,56
	Pre-defined thematic area (n=42)	17,48	3,85
	Pre-defined thematic area, topic & solution (n=46)	17,39	3,99
	Pre-defined thematic area & topic (n=79)	15,91	5,13
	Single-step Exploration (n=46)	14,78	4,04

One-way ANOVA tests were performed for comparing the post-scores of students for the six dimensions. **A statistically significant difference was found for all the dimensions (p<,05) apart from the self-efficacy dimension** ($F_{(4,245)} = 1,08$, p>,05). Post-hoc comparisons using the Dunnett C test showed that there were statistically significant differences between the "gradual exploration" and the "single-step exploration" for the self-determination, career-motivation, attitudes towards science outside school and intrinsic motivation. Students following the "gradual exploration pathway" had also a statistically significant higher post-score from the "pre-defined thematic area pathway" and the "pre-defined thematic area, topic and solution pathway" for the attitudes towards science outside school". For the intrinsic motivation dimension, there were also statistical differences between "gradual exploration" and "pre-defined thematic area, topic and solution pathway", as well as between the "single-step exploration" and "pre-defined thematic area and topic pathway". For the career motivation, there were statistically significant differences between the "single-step exploration pathway" and the "pre-defined thematic area and topic pathway" and the "pre-defined thematic area, topic and solution pathway". Statistical differences between the "single-step exploration pathway" and the "pre-defined thematic area and topic pathway" were also found for the attitudes towards practical work in science.

Overall, **it seems that the "gradual exploration pathway" offered to students the most opportunities for developing their science attitudes during the implementation of their project,**

whereas the "single-step exploration pathway" had a counteractive effect. Even though both pathways followed the most open approach to the SALL methodology, it seems that **the additional action of "exploring the topic" during the course of the project was an essential aspect for positive results** in terms of enhancing students' civic engagement and science attitudes. Frequently, open approaches to learning and problem-solving require the provision of support and guidance to students at different stages of a project and it seems that the "single-step exploration pathway" -which led to the direct definition of all key aspects of the project (thematic area, topic and solution) - might had complicated things for students. Hence, it is suggested that when open approaches to the SALL methodology are followed, a gradual exploration of the key aspects of the project is chosen, along with the support of societal actors, for facilitating and supporting the engagement of students.

4.4. Strengths - Weaknesses - Opportunities and Threats identified by participants before and after their involvement in the project: Suggestions of good practices

The objective of the Expectancies and Impact SWOT meta-analyses was to categorize the responses and comments posed by the participants in order to identify main trends beyond each country's context, which will support the proposition of targeted good practices and suggestions for the wider community implementations (year 2 and 3), as well as for practitioners that wish to implement similar projects in the future.

The **meta-analysis Expectancies SWOT** was developed by analyzing the responses of 101 teachers, 39 administrative staff and 37 societal actors from 53 schools in ten countries. In the context of the SALL project, the focus of this tool was to gain knowledge on the expected Strengths-Weaknesses-Opportunities-Threats for the implementation of the SALL methodology by all participatory levels. Specifically, the goal of the Expectancies SWOT was twofold: (1) to provide support to the participants especially, at the initial stages of the planning process of their school project, and (2) to gain an insight on how the SALL methodology was conceived by them before the start of their implementations. This information facilitated the on-going improvement of the SALL methodology. It also led to suggestions of materials and good practices that will subsequently support the wider community schools during the initial stages of their SALL school projects.

The **meta-analysis Impact SWOT** was performed at the end of the implementations to get an insight of what the actual impact of the SALL methodology per participatory level was, and also how the interaction between the different levels unfolded during the implementations based on how it was conceived by the participants. This information provided the opportunity to make targeted adjustments to the methodology and also to develop a lighter version of evaluation tools for the wider community of the SALL project (year 2 and 3). The Impact SWOT meta-analysis was developed by analyzing the responses of 57 teachers, 29 administrative staff and 55 societal actors from 35 schools in nine countries.

The results of the SWOT analyses are presented in four sections. In the first section, the main trends of Expectancies and Impact SWOTs of each country are presented. The second section focuses on the presentation of the meta-analysis of the Expectancies SWOTs, and the third section on the meta-analysis of the Impact SWOTs, along with a presentation of significant similarities and differences between the two meta-analyses. The final section (Section 4.4.4) concerns the synthesis of the main findings of both analyses.

4.4.1. Main trends for each country

Cyprus. The Expectancies SWOT of Cyprus was generated based on the responses of five teachers, four administrative staff members and nine societal actors. An overall sense of strength based upon participants' past involvement with school projects (mainly eco-related projects) was observed. This view was echoed by a number of participants in all three levels. For example, a teacher reported: "*I have already participated in other projects, in which we collaborated with external stakeholders and parents*" and a member of the administration stated that "*the school has already engaged in many eco-projects*". Both quotes show that this type of previous experience is considered as an important strength that can facilitate their participation in the SALL project. Their main weaknesses revolved around time management difficulties, such as finding time to interact and engage with societal actors/teachers. Specifically, one societal actor quoted the following "*please send us the specific questions to see them. We can also participate in an online meeting, but another day must be arranged...*". This sort of remark emphasizes the significance of planning ahead and establishing time frames for project implementations conjointly.

There are several similarities between the three levels of participation within the opportunities dimension, namely the positive prospect of developing student's skills and offering them new experiences. In contrast to the aforementioned remarks, some participants in the threats dimension believed that students' young age may impede the development of the project, while others considered that students propose overly ambitious ideas. Commenting on students' need for guidance, a number of participants expressed similar ideas as the following statement of a science teacher: "*I am gathering ideas for projects now but they are having problems coming up with good ideas as they are quite young*" and "*the second group is packaging materials – reducing the use of plastic so as to benefit the environment. This is a great idea but very difficult for them to do something about*".

The Impact SWOT of Cyprus was based primarily on the responses of four teachers, two administrative staff, and four societal actors. The Impact SWOT differs from the Expectancies SWOT in a number of important ways. The most pertinent point within the strengths dimension is that both societal actors and administrative staff recognized the importance of supporting and guiding students throughout the project. Two societal actors mentioned the following: "*My role was to offer guidance to the students for how to look after plants*" and "*we provide support depending on what the school needs and wants*". Also, teachers and administrative personnel recognized the critical need of including societal actors into their initiatives, as their support could facilitate their project. However, the primary issue they identified was the inability to approach and communicate effectively with societal actors. This issue was a recurring

theme for both administrators and teachers in the threats dimension. On the other hand, societal actors were more concerned with the school's schedule not aligning with their work schedule. Finally, schools provided a range of resources and infrastructure to participants, an opportunity which was considered to have had a significant impact on the progress of the projects.

Serbia. The Expectancies SWOT of Serbia consisted of four teachers, two students, three administrative staff members and nine societal actors. Their primary means of communication was through focus groups. The teachers participating were highly motivated to take part in the SALL project and they had previous experience in conducting different school projects. However, school administrators suggested that teachers might lack motivation. The schools' infrastructure was one of their key opportunities highlighted in that dimension, since they had a lot of space in the school, schoolyard, and school canteen which could facilitate the implementation of their projects. Moreover, the themes of unhealthy eating habits and low interest of their community regarding food concerns recurred across the threats dimension which were considered as possible hinders for the implementation of related projects.

Serbia's Impact SWOT analysis, including two teachers, two administrative staff, and two societal actors, verified teachers' high levels of motivation, which were channeled towards their initiative via successful student engagement. Additionally, societal actors contributed with their expertise and relevant materials and tools. Also, the school capitalized on its infrastructure and utilized it to their advantage. Interestingly, teachers at the beginning of their initiatives (Expectancies SWOT) expressed their concern that the quality of their data would be low, but they overcame this and additionally included a substantial number of women active in agriculture within their project. The threats dimension centered mainly on Covid-19 related challenges, and the school administration verified that all threats were successfully mitigated due to the involvement of parents on several levels, such as collecting food waste for compost and making elements for the yard.

Israel. Israel's Expectancies SWOT included 24 teachers, eight administrative staff and two societal actors. Pedagogical knowledge and various soft skills had a significant impact on the strength level of all participatory groups. Specifically, the participants considered themselves as knowledgeable in science subjects, environmental related issues, geography, and food-system knowledge. In addition, participants considered as their strengths the following skills: digital skills, creative thinking, design thinking, and project management. Another important strength mentioned was their ability to manage, motivate and engage students in innovative projects. For example, a teacher commented that "*I can encourage students and make them enthusiastic about their tasks, while raising their sense of "togetherness" and social doing*" and another teacher stated that "*The ability to intrigue students and to make them learn and collaborate – this is the secret of success of a project*".

The main weaknesses mentioned were the lack of budget to complete the projects and lack of connection to relevant societal actors. However, the latter was seen as an opportunity the project was offering to all the participants, namely an opportunity to strengthen the connections between the school and local societal actors. Furthermore, participants also believed that the SALL project would provide them with an opportunity to promote activism and environmental awareness. The most obvious finding that emerged from the threats dimension was mainly related to the Covid-19 restrictions, such as issues caused by social distance and the related difficulty in initiating face-to-face events with societal actors.

Israel's Impact SWOT was based on inputs from 19 teachers, six administrative personnel, and two societal actors. According to Israel's Impact SWOT, teachers were able to overcome a number of their weaknesses and transform them into strengths. Specifically, despite their heavy workloads, the teachers were able to successfully engage with other societal actors in their region and involve teachers from diverse disciplines to collaborate on the project. Within the weakness dimension, it was highlighted that teachers lacked the knowledge necessary to assist their students in increasing the significance of their project outcomes in terms of community involvement.

The opportunities dimension of Israel's SWOT analysis indicated that teachers' relationships with a variety of community societal actors were built quite effortlessly and were mutually beneficial. One teacher commented: "*We were surprised that people agreed to collaborate. There was a good response from the municipality and other stakeholders – which enabled us to take our project a few steps higher. They didn't make it harder for us*". Moreover, teachers and students overcame Covid-19 limitations, which were particularly evident in Israel's Expectancies SWOT, as students were committed to work online on several occasions, enabling the project to proceed, a fact that was also appreciated by societal actors. However, within the threats dimension, all participants (i.e., teachers, school administrators and societal actors) agreed that there was a considerable lack of time for project implementations. Also, the school team decided the subject for the project, not the students, which made it more difficult for students to feel connected to the project and, as a result, their motivation to contribute decreased.

Estonia. Six teachers, two administrative staff members and two societal actors contributed to Estonia's Expectancies SWOT. The most interesting aspect of their SWOT analysis was the high level of parental participation in school activities. Time constraints were recognized as an obvious drawback by all levels of participation. The majority of participants acknowledged that they were able to connect the SALL methodology with other projects in school. An additional benefit mentioned in the opportunities dimension was that the SALL project would offer to the individuals' personal growth and educational experience. An apparent threat mentioned by all participatory levels was their worry relating to their ability to carry out the project. For example, a teacher mentioned that "*our Living Lab project might not*

be realized, and we might lose motivation" and a societal actor stated that "*people might have a different vision on how to solve problems*".

Estonia's Impact SWOT included five teachers, four administrative staff, and six parents as societal actors. On one hand, Estonia's Impact SWOT demonstrated the effective collaboration between parents and students, which was anticipated based on their remarks in the Expectancies SWOT analysis. On the other hand, participants consistently identified time restrictions and a hefty workload as their primary shortcomings. Within the opportunities dimension, teachers and school administrators reported being able to connect the project to other existing projects. This was also a drawback since students were active in several other projects and thus, had less time to devote to the SALL project.

Croatia. Croatia completed their Expectancies SWOT analysis with the support of one teacher and one societal actor. In their SWOT, a sense of purpose for working on public-interest issues was found to be an important element within the strengths dimension. A barrier to the project was mainly the teacher's limited English language skills, which could be easily resolved with the translation of key support materials and also by offering alternative ways of participation in international events (for example, in the students' conference organized at the end of year 1, schools had the opportunity to prepare a video with subtitles, posters etc. in advance for presenting their work instead of doing a real-time presentation). Already established collaborations with other societal actors surfaced mainly in the opportunities dimension for both teachers and societal actors. Within the threats dimension, the teacher was most concerned about the inevitable circumstance of needing to include different students in the project during each school year. Specifically, the teacher explained "*I have included a class to which I am also a class teacher, next year I am teaching another class group of students, younger ones, and we will need to start over with the project*".

Croatia's Impact SWOT analysis consisted of one teacher and one societal actor. The Impact analysis emphasized the teacher's eagerness to learn new skills and the societal actor's capacity to improvise in novel social contexts. The main weakness reported by the teacher and the societal actor was lack of time. Furthermore, the teacher felt that the SALL project gave him/her an opportunity to create several contacts and to connect to other schools. The teacher highlighted the following: "*Everything is evolving so fast today that we need as many contacts as possible to stay up to date*" and "*our school has been organizing student exchanges for years, mostly with students from abroad we can connect officially with some schools in Croatia or other countries*". Croatia's threat dimension was related to Covid-19 restrictions and subsequent communication challenges.

Netherlands. Netherlands' Expectancies SWOT incorporated six teachers, four administrative staff, and one societal actor. What stands out in their analysis is that the school recognizes the necessity of

collaborating with societal actors. Teachers and students have a lot of experience working on projects and collaborating with societal actors. One teacher mentioned "*Students are used to thinking about how to organize/design society*" and another said "*Colleagues looking forward to the project. They are pioneers who like to do new things*". The lack of adequate time to complete the project was the most frequently mentioned weakness on Netherland's Expectations SWOT. For example, teachers mentioned: "*the school is not very flexible in relation to the fixed hours of teaching in the timetable*" and "*there is limited time to prepare the project*".

Closer inspection of the opportunities dimension indicated that the SALL project provided to the participants the opportunity to develop new skills and insights. A school administrator quoted the following: *"Collaboration with stakeholders show students different career options"* and *"Working with stakeholders gives us expertise for the future that is not there now"*. In the treats dimension, questions related to the feasibility of aspects of the project (e.g., students' level of involvement in the decision-making process) in a school context became apparent. For example, a school administrator and a teacher were questioning the following: "*are we including stakeholders enough in education?*", "*How far does student choices go? Preconditions and frameworks must be very clear to students*". Moreover, two school administrators were starting to become apprehensive as they realize that working with societal actors could be quite complicated e.g., "*Because there are multiple stakeholders there is a chance that the project will become too vague for them and thus stop*" and "*Getting multiple stakeholders to work well together is complex, especially for students*".

Six teacher, five administrative staff and 11 societal actors contributed to Netherland's Impact SWOT. There are several parallels between Netherland's Expectancies and Impact SWOTs. Teachers and administrative personnel cited past experience engaging with societal actors, and schools maintaining their own network of societal actors as important strengths. Additionally, societal actors stated that they previously worked with schools, indicating that all participatory levels considered prior networking experience as a significant strength. Within the weaknesses dimension, the Impact SWOT revealed that students required considerable guidance and structure in order to complete important actions associated with the project, such as contacting and recruiting societal actors, organizing and planning the project and agreeing on how to address a certain issue. For example, teachers stated the following: "it is *difficult to help students to get from a big topic to a smaller more manageable problem*", "*students experienced a barrier in conducting the project: approaching societal actors, finding test persons, interview skills*" and "*tricky to have societal actors formulate a question, then have students research it*". These remarks revealed that the communication between students and societal actors was challenging. This was also corroborated by societal actors, who thought that explicit framework criteria, regarding their role in the project, were necessary due to their "*little experience with this type of project*".

In regard to the opportunities dimension, all participatory levels agreed that the SALL project offers opportunities for co-operation and inspiration between everyone involved. Societal actors commented that the project offered them further collaboration opportunities between schools, students, and other societal actors, and stimulated further development. It also provided the opportunity to take into consideration students' recommendations as they "*gained new insights from students' creativity and out of the box thinking*". Two themes emerged from the threats dimension: scheduling issues amongst participants and aforementioned challenges within the weaknesses dimension. For example, a teacher mentioned that "*scheduling is difficult because there are a lot of class cancellations*", and a societal actor said "*finding a good time when everyone was available was difficult*".

France. France included in their Expectancies SWOT 18 teachers, nine administrative staff, and four societal actors. Previous experience in eco-projects had a significant impact on France's strengths dimension as all three participatory levels mentioned that the Ministry gave students the opportunity to elect an eco-representative for each class at schools, and initiate actions to promote sustainable development and combat climate change. Thus, students, teachers and schools in France had extensive experience in project work. One interesting finding in the weaknesses dimension was the diversity of the student population, such as individuals dealing with social difficulties and students disengaged due to socioeconomic factors.

A recurrent theme in France's Expectancies SWOT was a sense of opportunity amongst participants that the project would allow them to interact with other schools in their town and for the school teaching staff to exchange practices. One concern expressed in the threats dimension was related to funding and whether the school administration would support the project implementations and provide the resources required.

Within the Impact SWOT of France, including three teachers, two administrative staff, and eight societal actors, there was a spirit of collaboration and coordination in order to generate the necessary resources for their project. The opportunities dimension revealed the active participation, engagement and support from teachers from different disciplines and partnerships with local organisations. Teachers reported that their weaknesses were mainly revolved around lack of support from the principal and local authorities. The threats dimension in Frances' Impact SWOT had to do mainly with restrictions brought forth by the pandemic and challenges they had to overcome.

Greece. The Expectancies SWOT of Greece included 17 teachers, three administrative staff and one societal actor. Previous experience in projects mainly related to open schooling was a major influence on participants' sense of strength and confidence. As one teacher put it: *"I was participant to OSOS project, so I have experience in understanding the ways of collaboration for open schooling. As teacher, I*

have participated in many pilot EU projects that needed research skills, so I can support students". Furthermore, the understanding of the relation of their teaching philosophy to the SALL methodology was considered as a strength by a lot of participants. For example, a teacher stated that *"the SALL methodology is very close to my philosophy, and I like to bring it to class and engage my students"*.

However, even though most the participants had a lot of experience with innovative projects, some lacking confidence in implementing the SALL methodology and more guidance and information was requested (e.g. *"I want systematic guidance [...] I would like to know the sub-axes of the specific project as well as the expected deliverables with the completion of the project so that the planning of the actions is complete, and the results of the project are successful")*. Moreover, teachers and school administrators expressed that they have limited understanding on how to attract relevant societal actors. As a teacher quoted: *"We have never had to work with several societal actors for a long-term project. Our main collaborations thus far mainly concerned one-day presentations by different organizations for a specific concept [...]"*.

The most dominant statement in the opportunities dimension was about the support that participants will receive during the project, mainly from the school management, the Municipally, parent's association, companies within the local community, and support from the NC of the SALL project. Another frequently mentioned aspect of the opportunities dimension was the school's location, its surroundings, and the presence of well-equipped laboratories within the school. A number of participants in the threats dimension voiced their concerns with the school's lack of extra-curricular teaching time and national curriculum restrictions, which obstruct the progress of the project.

Greece included in their Impact SWOT seven teachers, five administrative staff, and 15 societal actors. An overall sense of strength based upon participants' past involvement with school projects (mainly eco-related projects) was observed within the Impact SWOT of Greece. This view was echoed by a number of participants in all three levels. For example, a teacher reported: "*Implementation of several programs and actions with the participation of social organizations, and individuals/professionals from various disciplines and specialties*". Furthermore, teachers commented on their digital skills "*I use modern technology both in communication and in the production of pedagogical material*" as an important aspect of their own strengths which proved to be beneficial for them during the project.

Teachers' main weaknesses were revolved around developing their skills and expanding their knowledge on project-related topics, such as the SALL methodology and deliverables. Specifically, one teacher quoted the following: "*I want systematic guidance on the theoretical framework for the application of the methodology of SALL. I would like to know the sub-axes of the specific project as well as the expected*

deliverables with the completion of the project so that the planning of the actions is complete, and the results of the project are successful".

There are a number of similarities between the three levels of participation within the opportunities dimension, namely the positive prospect of developing students' skills and offering them innovating experiences. A teacher stated the following: "*There is a positive attitude on the school administration and the teachers to try and apply innovative teaching methods and give learning opportunities to the students by opening the school's doors to society […]*". The threats dimension statements were consistent with the Expectancies SWOT comments and concerned time management, demanding workload, and a lack of time for extra-curricular activities.

Portugal. The Expectancies SWOT of Portugal consisted of 12 teachers, four school administrators and eight societal actors. The most dominant statements expressed in the strengths dimension were the strong willingness to improve public health and the experience in working on the theme of food waste. These statements were accompanied with the quotes from two school administrators: *"Schools can or should function as vehicles that provide the development of more aware adults and sensitized to certain themes, such as the case of a healthier and more sustainable diet"* and *"During my degree I had the opportunity to do an internship in community nutrition within a school. During this period, I felt the need for a nutritionist to act in this context, in order to establish knowledge about adequate and health-promoting food for children 'of today' who will be the adults 'of tomorrow"*.

The majority of teachers and school administrators agreed with the statement that it is difficult to promote the participation of all societal actors in an equitable way*: "Placing students and partners on the same level depends a lot on the level of education of the students, otherwise the partners end up performing similarly to the teacher"*. At the same time, societal actors felt they lacked knowledge regarding reality of schools, school curriculum and teaching methods practiced today by confirming that *"This lack of knowledge makes it difficult to create proposals and methodologies that facilitate the integration of schools in this type of project"*.

In the opportunities dimension participants felt that the school board will support this initiative and to implement innovative projects. The following comment illustrates the sense of support offered by the school: *"The school board encourages/supports the development of innovative projects, making resources available whenever possible"*. Within the threats dimension, participants mostly expressed their concerns regarding the Covid-19 measures as well as lockdown possibilities, which could affect the progress of the project.

The Impact SWOT of Portugal, based on seven teachers, two administrative staff and six societal actors, revealed the participants' knowledge in areas related to the food-system, as well as their experience in project coordination as important strengths. Specifically, one societal actor quoted the following: "*The "know-how" to convey to those involved some concepts such as the full use of the food prepared in the school canteen (addressing food waste) or how to the food into a healthy and sustainable diet*". Furthermore, school administrators and teachers support that involving students in projects revolving around the food system are regarded as highly significant, as one administrative personnel stated: "*Schools can or should function as vehicles that provide the development of more aware adults and sensitized to certain themes, such as the case of a healthier and more sustainable diet*". The lack of digital skills and of knowledge regarding the food-system, the engagement with societal actors and the SALL methodology were recognized as drawbacks by all levels of participation. For example, a societal actor mentioned: "*This lack of knowledge makes it difficult to create proposals and methodologies that facilitate the integration of schools in this type of project*".

The majority of participants expressed gratitude for the support they received from the local community, the school board and teachers, which was conceived as critical to the project's success. For example, a societal actor mentioned that: "*We feel that this is a bottom-up structure, which is an extraordinary opportunity*". An additional advantage highlighted in the opportunities dimension was that students demonstrated a high level of commitment and responsibility and recognized the critical nature of environmental solutions. Finally, an apparent threat mentioned by all participatory levels was time management/workload issues combined with restrictions posed by the pandemic.

Spain. The Expectancies SWOT of Spain included six teachers and two school administrators. The most dominating statement presented in the strengths dimension was associated with teachers' previous experience in project work. For example, a teacher stated that *"Our school is working with different projects that implement the SALL methodology such as: NATURA project (use of the environment surrounding the school), Padre Piquer project (unified pupils, cooperative work)".* Within the weaknesses dimension both the teachers and administrative staff expressed their lack of time and subsequent time management difficulties while trying to prioritize tasks concerning the school curriculum. The already established collaborations and connections with the local community was considered as an opportunity for both teachers and administrative staff, whereas both participatory levels voiced their concerns regarding students' lack of motivation to continue the project.

4.4.2. The Expectancies SWOT Meta–Analysis

The number of participants for each participation level across the ten participant countries is presented in the table below:

Table 7: Number of schools, teachers, administration staff and societal actors participating in the Expectancies SWOT analysis

Country	Schools	Teachers	Administration staff	Societal Actors
Greece	16	17	3	1 (School canteen)
Croatia	1	1	-	1 (local producer)
Portugal	6	12	4 school headmasters	1 organization responsible for promoting zero waste lifestyle 1 organization responsible for providing meals to the school canteen 1 representative of Parents' Association 1 nutritionist 1 representative of an organization that 'crunches' down science to contents that everyone can understand 1 nutritionist, working at the city council, and as a professor at Universidade do Algarve 1 representative of the Health Office of the City Council; 1 nurse from a Unit of Continuing Care
France	6	16 teachers (+ 2 civic service interns)	1 CPE (special councilor on education) 5 school principals 3 assistants to the principal	3 NGOs (T.I.G.E, Fruits défendus, Discosoup) 1 AMAP (network of short circuit between green farmers and urban inhabitants)
Netherlands	4	6	4	1 student
Serbia	2	4 (+ 2 students)	2 principals 1 teacher	3 (Representative from Municipality) 2 (local entrepreneur), 2 (Institute of Public Health), 2 (local NGO activist)
Estonia	2	6	2 (project manager, school activities leader)	2 parents
Israel	8	24	8 participants: principals, science coordinators, a pedagogical coordinator and a	2: Technological Education company and academy

			school director deputy	
Cyprus	5	5	4 participants: 2 Head of Science Department, 1 Admissions Officer 1 Assistant General Manager	9: Tiganokisi, Lidl Cyprus and Greece, Milrose Patisserie, Alion Vegetables & Fruits Co Ltd, Amaryllis Petinou Pharmacy, Pan Motors, JK Garden Maintenance services, ISOP PTA, Green Dot Cyprus
Spain	3	6	2	-
TOTAL	**53**	**101**	**39**	**37**

In total, 101 teachers and 39 administration staff members participated in the Expectancies SWOT analysis, from 53 schools in total. Also, 37 societal actors with a different background, expertise and involvement in the school projects provided their input at the beginning of the SALL project's implementations.

The table of Expectancies SWOT meta-analysis (see Table 8) is divided in three columns, one per participatory level (teachers, school and societal actors), and in four rows for each dimension (Strengths-Weaknesses-Opportunities-Threats). In each cell, the categories deriving from the open coding analysis of the data (see Section 3.2.3 for more details) are presented, along with the frequency of appearance of the statements belonging in each category. The categories with a frequency of appearance higher than 7 were considered as the most dominant and hence, more information is provided in the sections that follow.

Table 8: The meta-analysis of the Expectancies SWOT

	TEACHERS	SCHOOL	SOCIETAL ACTORS
STRENGTHS	Previous experience in: • School Projects (n=51) • Collaborating with societal actors (n=9) • Food system topic (n=2) Intrinsic motivation: • Making a change in the community (n=7) • Introducing new methodologies (n=10) • Teamwork (n=7) • Creating a LL (n=3) Self-efficacy: • Supportive nature (n=5) • Adaptability (n=5) • Role model for students (n=2) Background knowledge: • Content knowledge about the food system (n=14) • Pedagogical knowledge (n=17)	Previous experience in: • School Projects (n=27) • Collaboration with societal actors (n=4) Already established collaborations: • With societal actors (n=14) • With parents (n=6) • Between the school staff (n=5) • With other schools (n=4) Supportive nature: • Towards collaboration (n=13) • Towards the project (n=12) • Environmental issues (n=1) • Encouraging students (n=1) Skills: • Management (n=2) • Digital skills (n=2) • Soft skills (n=1)	Previous experience in: • School Projects (n=6) • Collaborating with schools (n=3) • Collaborating with local community (n=1) Intrinsic motivation: • Towards educating students (n=9) • Towards collaboration (n=2) • Towards participating in such projects (n=3) • Promoting health/healthy eating (n=3) Already established collaborations: • With local community (n=6) • With teachers (n=3) Background Knowledge: • Content knowledge about the food system (n=8) • English Language (n=1) Personal skills/ skills of the team:

	• In involving societal actors (n=6)
	• LL methodology (n=4)
	• Knowledge of the team's characteristics (n=6)
	• English Language (n=5)
	
	<u>Personal skills:</u>
	
	• Ability to collaborate well with:
	  ▪ other teachers (n=10)
	  ▪ with the administration staff (n=4)
	  ▪ with other schools (n=2)
	  ▪ with parents (n=7)
	  ▪ with students (n=11)
	  ▪ with the local community (n=6)
	
	• Communication skills (n=10)
	• Problem solving skills (n=10)
	• Organization skills (n=6)
	• Creativity (n=5)
	• Digital skills (n=6)
	• Marketing skills (n=2)
		<u>Motivation (n=5)</u>
		
		<u>Content knowledge (n=2)</u>
		
		<u>Alignment with the school's curriculum (n=5)</u>
		
		<u>Good dynamics between the team (n=6)</u>
		
		<u>Adequate school resources/infrastructure (n=9)</u>
		
		<u>Good reputation (n=1)</u>
		
		<u>Available funding (n=2)</u>
			• Digital skills (n=2)
			• Collaboration skills (n=2)
			• Communication skills (n=1)
			• Organization skills (n=2)
			
			<u>Available resources/infrastructure (n=1)</u>
			
			<u>Diversity of the team (n=3)</u>

WEAKNESSES	Lack of previous experience: • In food system related concepts (n=2) • LL methodology (n=2) • In school projects (n=1) • In team-work (n=1) • In recruiting societal actors (n=12) • In engaging societal actors (n=4) Restrictions due to: • The national curriculum (n=1) • The teacher's role in the school (n=3) • Due to time constrains (n=9) • Workload management (n=5) • Due to covid (n=2) Managing expectations (n=3) Lack of personal skills: • Organization skills (n=6) • Collaboration skills (n=8) • English language (n=4) • Digital skills (n=9)	Lack of previous experience: • Working with societal actors (n=6) • LL methodology (n=1) Lack of connections with societal actors (n=8) Uncertainty of the project continuation (n=1) Small number of students/staff (n=2) WSC2. Fear of overburdening students in the school (n=1) Diversity in student population (n=1) Lack of knowledge: • Technological knowledge (n=1) • Content knowledge (n=1) • Specific knowledge about food systems • About LL (n=4) Risk-taking (n=1) Lack of problem-solving skills (n=1) Staff's lack of Motivation (n=2)	Time constrains/pressures (n=9) Long distance from the school (n=1) Lack of organization skills (n=4) Limited resources/infrastructure (n=1) Lack of previous experience in LL methodology (n=3) Lack of knowledge: • Pedagogical knowledge (n=3) • School curriculum (n=2) • Content knowledge (n=2) • about the SALL project (n=3) Lack of interest in participating in the project (n=1) Indifference towards the topic of food system (n=1) Lack of contacts (n=1)

	Lack of knowledge in regards to: • The SALL project (n=8) • Content knowledge (n=6) • Pedagogical knowledge (n=7) Managing students' needs (n=3)	Restrictions: • Limited resources/infrastructure (n=5) • Time constrains (n=2) • Workload management of the staff (n=6) Bureaucracy issues (n=1) Lack of collaboration within the staff members (n=5) Project is not aligning with school curriculum (n=2) Lack of funding (n=5) COVID related issues: • Online classes (n=2) • Lack of f2f interaction (n=2) • Different learning experiences (n=2) • Small number of students engaged in the project (n=1)	
OPPOR	Already established projects by the school (n=6) Students' experience in: • similar projects (n=2) • online collaboration (n=1)	Already established projects (n=1) Already established collaborations (n=5) The potential opportunities the project can provide in terms of establishing collaborations with:	Already established collaborations: • With school (n=1) • With other societal actors (n=2) • With local government (n=1)

T U N I T I E S	Already established collaborations: • With societal actors (n=11) • Collaborations between teachers (n=3) Students' eagerness to participate (n=13) Long-term implementation of the project due to students' young age (n=2) The potential opportunities the project can provide in terms of: • Establishing collaborations with societal actors (n=13) • Establishing collaborations between teachers (n=3) • Developing positive attitudes (n=7) • Developing knowledge (n=2) • Developing students' skills (n=6) • Developing pedagogical skills (n=4) • Connecting the LL methodology to ongoing projects (n=8) Relevance to the curriculum(n=6)	• societal actors (n=14) • other schools (n=1) • parents (n=2) • the local community (n=3) • school staff (n=2) • other projects (n=3) • between students (n=1) Popularity of the food system topic (n=4) Open mind-set of the staff (n=4) The potential opportunities the project can provide in terms of: • Developing skills (n=11) • Helping the community (n=1) • Increasing school's reputation (n=2) • Marketing opportunities (n=1) Students' eagerness to participate (n=3) Connection to the school curriculum (n=3) School resources/infrastructure (n=3)	The possibility of establishing collaborations with: • Other societal actors (n=3) • Government officials (n=1) • With parents (n=1) • With consumers (n=1) • With school, teachers and students The potential opportunities the project can provide in terms of: • Developing new skills and experiences (n=6) • Raising awareness about environmental/heath issues (n=6) Motivation (n=4) Already established projects in relation to food system within the community (n=6) Opportunity to disseminate school's actions (n=1) Funding opportunities (n=3) Marketing opportunities (n=2) Connection to the school curriculum (n=3)

	Opportunity to solve community problems (n=8) Provision of support by: • The NC (n=3) • The School (n=15) • The Local community (n=9) • Parents support (n=1) School resources/infrastructure (n=17) School's prominent location (n=4) Opportunity to disseminate school's actions (n=3)	Digital skills (n=1) Available funding (n=2)	Close proximity of the societal actor to school (n=2) Creativity (n=2)
THREATS	Possibility of losing students' motivation (n=4) Collaboration difficulties with societal actors (n=13) Lack of co-operation: • by parents (n=1) • between peers/school (n=8) Restrictions posed by: • Time constrains/pressures(n=9)	Collaboration difficulties with societal actors in: • Ensuring active engagement (n=10) • Recruiting (n=6) • Lack of interest in participating (n=3) • Interacting with students (n=2) • Providing benefits (n=1) • Understanding the project's goal (n=1) Difficulties in establishing collaborations: • with school's abroad (n=1) • between peers (n=1)	Lack of support by the school (n=2) Difficulties in communicating with students (n=3) Time constrains (n=4) Lack of motivation/interest (n=6) Possible changes within an organization (n=2) Lack of funding (n=2) The promotion of unhealthy eating habits by larger companies (n=2)

	• School timetable/curriculum (n=4) • School regulations (n=2) Workload pressures (n=10) Ambiguity of project goals (n=6) Lack of resources/infrastructure (n=5) Fear of not succeeding in the project (n=6) Students require guidance in completing projects (n=14) Lack of students' collaborative skills (n=3) Lack of motivation by: • students (n=2) • teachers (n=4) No funding (n=5) Change of staff during the school year (n=9) Different students for year 2 (n=1) Lack of local community support (n=8) Lack of previous experience in projects (n=1) Resistance to change (n=1) COVID related issues:	Unfamiliarity with the LL methodology (n=2) Resistance to change by teachers (n=3) Lack of resources/infrastructure (n=2) Lack of motivation (to participate) by: • the school's community (n=2) • students (n=1) • parents (n=3) • teachers (n=1) Lack of interest towards: • the topic of food system (by teachers) (n=2) • improving eating habits (by local community) (n=1) Lack of funding (n=4) Restrictions posed by: • Time constrains/pressures (n=4) • Socio-economic problems of families (n=1) • By school timetable/ curriculum (n=5) • Changes in education/school (n=3)	Resistance in changing eating habits (n=3) COVID related issues: • Difficulties in communicating (n=6)

	• Communication issues (n=13) • School closing (n=1) • Non-significant work (n=3) • Social distance (n=1) • Decrease in motivation (n=2) • Covid Measures (n=11) • Health worries (n=1) • Uncertainty of next steps due to COVID measures (n=1) • Time spent with students (n=1) • School organization (n=2) • Lack of time (n=1) • Online lessons (n=3)	<u>Students require guidance in completing projects (n=3)</u> <u>COVID related issues:</u> • Collaboration issues (n=3) • Decrease in motivation (n=1) • Covid Measures (n=3) • Co-operation issues (n=3) • Communication issues (n=6) • Online learning (n=2)	

STRENGTHS DIMENSION

As shown in Table 9, teachers had the highest participation in the Expectancies SWOT analysis and they especially expressed the most strengths-related comments (240 in total), accounting for 56% of the total number of comments in this SWOT dimension. Conversely, the school and societal actors received 30% and 14% of remarks respectively. Hence, it appears that participants concentrated more on their internal strengths that could benefit them throughout their school project, rather than on factors that could impede the proper implementation of their projects. The number of dominant categories and the percentage of responses for the Strengths dimension per participatory level are presented in the table below:

Table 9: The percentage of responses and number of dominant categories of each participatory level for the Strengths dimension

	Teachers	**School**	**Societal actors**
Percentage of comments (n=423)	56%	30%	14%
Number of dominant categories (n>7)	9	5	4

The **nine** high-frequency categories for the teachers' **strengths** dimension are:

1. *Previous experience in school projects*
2. *Previous experience in collaborating with societal actors;*
3. *Intrinsic motivation in introducing new methodologies to their teaching practice;*
4. *Content knowledge about the food system;*
5. *Pedagogical knowledge;*
6. *Ability to collaborate well with other teachers*
7. *Ability to collaborate well with students*
8. *Communication skills*
9. *Problem-solving skills*

The **five** high-frequency categories for the schools' **strengths** dimension are:

1. *Previous experience in school projects;*
2. *Already established collaborations with societal actors;*
3. *Schools' supportive nature towards collaboration*
4. *Schools' supportive nature towards the SALL project;*

5. *Adequate school resources/infrastructure.*

In addition, the **four** high frequency categories for the societal actors' **strengths** dimension are:

1. *Previous experience in school projects;*
2. *Intrinsic motivation towards educating students;*
3. *Already established collaborations with local community;*
4. *Content knowledge about the food system.*

Previous experience in school projects seems to be an important determinant of participants' sense of strength as it was expressed, with the highest number of repetitions, in all three participatory levels. Participants have previously been involved in European projects related to STEAM education, open-schooling and/or environmental issues all of which were considered as important experience that can facilitate the participation in the SALL project. Specifically, teachers have mentioned copiously statements like: "*I have participated in projects with students where other members of community are included"* (Croatian teacher)*, "I have already participated in other projects, in which we collaborated with external stakeholders and parents"* (Cypriot teacher).

Both teachers and schools (i.e., administrative staff) share a number of key features within the strengths dimension. Specifically, **already established collaborations with societal actors and previous experience in collaborating with societal actors** were frequently stated. Furthermore, the societal actors and teachers participating in the SALL project considered themselves highly knowledgeable about the food system (i.e., *content knowledge about the food system)*. The following two statements are particularly revealing:

"… I know some people who are producers of traditional food in the community. I think it will make it easier for us to include them in the program" (Croatian societal actor).

"The Maria Granel Zhero Program (an environmental educational project), promotes several workshops given by nutritionists and other specialists with teams responsible for canteens and bars on plant-based food and without waste, which could also be an asset for the SALL project" (Portuguese societal actor).

Emphasizing on some of these strengths expressed in the Expectancies SWOT could be a great starting point of preliminary discussions during the introduction of the objectives of the project to all participatory levels since it could increase participants' confidence in their ability to participate and implement a successful LL project. Making connections to their previous projects and experiences (e.g., when working with a societal actor) can showcase to participants that building on previous experiences is possible and easy to do.

WEAKNESSES DIMENSION

Table 10 presents the percentage of responses of each participatory level for the weaknesses dimension. More than half of the comments were received from teachers, 32% from administrative staff, and just 15% from societal actors. Although the overall number of administrative staff and societal actors included in the meta-analysis was about equal, the percentage of responses obtained from societal actors was almost half the responses of the schools' administration staff, demonstrating the provision of less emphasis on aspects of internal origin that could negatively affect a school project.

Table 10: The percentage of responses and number of dominant categories of each participatory level for the Weaknesses dimension

	Teachers	School	Societal actors
Percentage of comments (n=204)	51%	32%	15%
Number of dominant categories (n>7)	5	1	1

The main **weaknesses** (**n=5**) expressed by teachers were revolved around the:

1. *Lack of previous experience in recruiting societal actors*;
2. *Restrictions due to time constrains*;
3. *Lack of collaboration skills;*
4. *Limited digital skills*; and
5. *Lack of knowledge in regards to the SALL project.*

In the **weaknesses** dimension, schools and societal actors reported **one** high frequency category each:

School: *Lack of connections with societal actors*

Societal Actors: *Time constrains/pressures*

A variety of perspectives were expressed by teachers and schools in relation to either **recruiting or connecting with societal actors**. Comments such as "*difficulty in identifying societal actors that can facilitate the project*" (Cypriot teacher) and "*little experience in involving community partners in projects*" (Portuguese teacher) were posed repeatedly. A common view amongst teachers and societal actors was the **challenge of balancing their work-related responsibilities with the time needed to develop the project**. Moreover, quite a few teachers commented on their **lack of knowledge with regard to the SALL project**. Mainly their quotes were centered around the participants uncertainty or confusion

relating to the general goals of the project and the meaning of the collected data. Additionally, teachers stated that a **lack of digital competency** was one of their greatest weaknesses.

One of the main themes that emerges from these findings is the **lack of experience or internal insecurities relating to recruiting or connecting to societal actors.** Participants would benefit from receiving training and support by NCs in matters such as the process of brainstorming possible societal actors to include in the project, making the first move to contact them, how to present to them the information relating to the SALL project, and how to explain to societal actors their role and responsibilities. The related materials (e.g., the deliverable "*Methodology for the Engagement of School Living Labs with Stakeholders*") and workshops developed thus far for supporting schools during their collaboration with societal actors could increase participants' knowledge and confidence in related issues and also eliminate or minimize any uncertainties in relation to the SALL project's objectives. In addition, the provision of context-specific societal actors that will probably be willing in participating in the school project can be of great help for schools, especially for those that lack of connections.

OPPORTUNITIES DIMENSION

The meta-analysis has revealed several factors that are considered as opportunities for a successful implementation of a LL project which relate to the interaction between the different participatory levels. Table 11, presents the percentage of comments in the Opportunities dimension described by teachers, administrative staff and societal actors. Teachers mentioned various ways which could possibly optimize the implementation of their school project with 57% of the total number of comments. In comparison, school administrators and societal actors garnered 26% and 16% of comments respectively.

Table 11: The percentage of responses and number of dominant categories of each participatory level for the Opportunities dimension

	Teachers	School	Societal actors
Percentage of comments (n=270)	57%	26%	16%
Number of dominant categories (n>7)	8	2	2

As seen from Table 11, the **Opportunities** dimension for teachers revealed **eight** main trends:

1. *Already established collaborations with societal actors;*
2. *Students' eagerness to participate;*

3. *The potential opportunities the project can provide in terms of establishing collaborations with societal actors*
4. *The potential opportunities the project can provide in terms of connecting the LL methodology to ongoing projects*
5. *Opportunity to solve community problems;*
6. *Provision of support by the school;*
7. *Provision of support by the local community;*
8. *School resources/infrastructure.*

In the **Opportunities** dimension, schools and societal actors reported **two** high frequency categories each:

- School:
    1. *The potential opportunities the project can provide in terms of establishing collaborations with societal actors; and*
    2. *The potential opportunities the project can provide in terms of developing skills.*

- Societal Actors:
    1. *The potential opportunities the project can provide in terms of developing new skills and experiences; and*
    2. *Already established projects in relation to the food system within the community.*

Teachers revealed that **school resources and infrastructure** are an important component for the successful implementation of the project. Indeed, many schools offer "*individual study centers surrounded by nature and community gardens*" (administrator from Estonia), "*the existence of equipped natural science laboratories*" and "*STEM clubs*" (Greek administrator) within the school walls which can accommodate a variety of projects.

Already established collaborations or the potential opportunity of establishing collaborations with societal actors was a significant contributory factor for supporting the development of a SALL project as expressed by both teachers and administration staff, since this is one of the highest mentioned categories within the opportunities dimension. For example, a Dutch administrative staff said: "*The project provides the school a broad network who can be involved with the school for a long time*". Another participant stated, "*this is an opportunity to strengthen the collaboration with community*

stakeholders" (Administrator from Israel). These statements reveal the significant benefits the project can offer to the school community since the SALL project promotes a culture of collaboration between entities inside and outside the school and it can support with a step-by-step process the establishment of a collaborators network within the community.

Another important benefit mentioned by the school and societal actors is **the potential opportunities the project can provide in terms of developing skills.** Participants acknowledge that the SALL project is viewed as "*an opportunity for the school teaching community to exchange practices*" (French administrator) which can "*provide new insights and skills*" (Dutch administrator) as well as "*personal growth and gaining experiences*" (Estonian societal actor).

Overall, the opportunities dimension of the meta-analysis included statements that pertain to the type of opportunities the project offers to the participants, rather than statements highlighting what opportunities do the participants provide that can facilitate the implementation of the LL methodology and the school project. **Since commonalities in the opportunities expressed by the participants exist, foregrounding them before and during a school project can facilitate the collaboration between them.**

THREATS DIMENSION

The table below provides an overview of the percentage of responses and the number of prominent categories for each participatory level for the Threats dimension.

Table 12: The percentage of responses and number of dominant categories of each participatory level for the Threats dimension

	Teachers	School	Societal actors
Percentage of comments (n=272)	60%	28%	11%
Number of dominant categories (n>7)	9	1	-

The most striking result emerging from this data is that teachers provided the greatest number responses in this dimension in proportion to their remarks in the Weaknesses and Opportunities dimension and almost a similar percentage of responses with the Strengths dimension. This indicates that most of their concerns in terms of aspects that can have a negative impact on the implementation of their project are related to the interaction they will develop with the other participatory levels. In comparison, school administrators and societal actors generated 28% and 11% of responses, respectively for this dimension.

This dimension showed **nine** main obstacles participants might face during their implementations of the SALL project, as expressed by teachers:

1. *Collaboration difficulties with societal actors;*
2. *Lack of co-operation between peers/school;*
3. *Restrictions posed by time constrains/pressures*
4. *Restrictions posed by Workload pressures*
5. *Students require guidance in completing projects;*
6. *Change of staff during the school year;*
7. *Lack of local community support.*
8. *Communication issues due to Covid-19*
9. *Covid-19 measures*

The meta-analysis revealed **one** high frequency category for the school and none for societal actors (n>7):

School: *Collaboration difficulties with societal actors in ensuring active engagement.*

Teachers were apprehensive about their students' capacity to complete the project and their anticipated need for **systematic supervision and support**. For example, *"students need a lot of support and guidance to complete the project", "students propose overly ambitious ideas"* and *"students are not able to have applicable ideas due to the young of their age"* (Cypriot teachers) *relate to the aforementioned conclusion*. Furthermore, teachers voiced their concerns regarding the **lack of local community support** stating the "*lack of a culture of equal and sincere cooperation between societal actors and schools*" (Greek teacher). Statements related to the thematic of the project **(food system)** were also pointed out by the teachers; "*low interest of wider community about issues about food*" (teacher, administrator and societal actor from Serbia) and "*unhealthy eating habits in population of local community*" (teacher and administrator from Serbia) might prove to be a key barrier to a project.

Another reported potential problem was the **collaboration difficulties with societal actors** while **ensuring their active engagement** commented by both teachers and administrative staff. Similarly, three societal actors expressed their **lack of motivation and interest** in participating in food-related projects by stating the "*low interest of the wider community about issues related to food*" (societal actors from Serbia).

Furthermore, teachers expressed concerns that they might encounter **communication difficulties and hurdles, owing to the strict Covid-19 measures and restrictions** imposed by their country's government. Specifically, teachers commented the following: "*Communication between student group members is made difficult because of COVID-19 restrictions*" (Dutch teacher), "*Hard to maintain long and continuous face-to-face connection with the students at this period"* (Israeli teacher), and *"The timing of the program's implementation is a negative element, and this makes it complicated"* (Greek teacher).

These findings highlight the **perceived hurdles that participants think they might encounter during their implementations**. Specifically, the lack of confidence expressed by participants (especially teachers) when it comes to **collaborating with others - external entities, the local community and students - is a focal point of their concerns** which is also somehow evident in the weakness dimension, a finding which portrays the internal (e.g., they personally feel that they will be unable to establish successful collaborations) and the external origin (e.g., aspects of the interaction with others might hinder the establishment of successful collaborations) of this concern. Hence, turning this particular threat into an opportunity at the early stages of a school's project seems of pivotal importance. This

aspect of the project can be addressed as an opportunity to establish a network with external societal actors – or enlarging an existing one – and also as an opportunity for the school to be an important agent of change in the local community. Hence, supporting participants with relevant tools, materials, and workshops in identifying, recruiting, and establishing an on-going collaboration with societal actors within a LL approach can have a significant effect on the enhancement of their knowledge and self-efficacy, especially for participants that consider this as an internal weakness of theirs. These tools and materials can also facilitate the development of effective communication and monitoring strategies that can be employed by the LL participants which can be then adjusted based on the context of each LL project by the NC or the actual participants.

4.4.3. The Impact SWOT Meta–Analysis

The number of participants for each participation level is presented in the table below:

Table 13: Number of schools, teachers, administration staff and societal actors participating in the Impact SWOT analysis

Country	Schools	Teachers	Administration staff	Societal Actors
Greece	6	7	1 school Manager 1 Teacher 3 (did not elaborate)	15: school cleaning staff, alumni, school canteen, neighborhood shop**,** 11 parents
Croatia	1	1	-	1
Portugal	5	7	1 School headmaster 1 Headmaster deputy	6: organization responsible for promoting zero waste lifestyle, representative of Parents' Association, nutritionist, representative of an organization that 'crunches' down science to contents that everyone can understand, representative of the Health Office of the City Council, nurse from an Unit of Continuing Care
France	2	3	1 principal 1 vice principal	8: community garden, youth association, soil analysis company, primary school, city council, parents, NGO, mayor

Netherlands	4	6	3 Principals 1 Project coordinator 1 Team manager	11: Teachers and school staff talked about their experience with working with societal actors during the SALL-project
Serbia	2	5	1 School pedagogue 1 Principal 1 Principal's assistant	2: grocery store chain representative and an NGO member
Estonia	2	5	1 project manager 1 school event manager 2 headmasters	6 parents
Israel	8	19	6 participants: 1 principal, 4 science coordinators, and 1 school director deputy	2: Technological Education company, and academy
Cyprus	5	4	2 (Head of Science)	4: recycling company, patisserie, garden maintenance services, vegetable & fruit shop
TOTAL	**35**	**57**	**29**	**55**

In total, 57 teachers and 29 administration staff members participated in the Impact SWOT analysis, from 35 schools. It seems that NCs were able to engage fewer teachers and administrative staff to the Impact SWOT analysis in comparison to the Expectancies SWOT but a larger number of societal actors participated (55 in total), probably since during the collection of data for the Expectancies SWOT not all schools were able to engage societal actors in their projects. This struggle might relate to lockdown regulations that schools were encountering during the initial steps of their projects, and this fainted out during their future actions.

The table of the Impact SWOT meta-analysis (see Table 14) was developed following the same format as the Expectancies SWOT meta-analysis. In each cell, the categories deriving from the open coding analysis of the data (see Section 3.2.3 for more details) are presented, along with the frequency of appearance of the statements belonging in each category. The categories with a frequency of appearance higher than 7 were considered as the most dominant and hence, more information is

provided in the following sections. It is noted that for the level of school administrators, two dimensions (Weaknesses and Threats) did not include a category with 7 responses, and hence the categories immediately following were chosen. More information about the dominant categories for each participatory level and dimension is provided in the following sections.

Table 14: The meta-analysis of the Impact SWOT

	TEACHERS	SCHOOL	SOCIETAL ACTORS
STRENGHTS	<u>Previous experience in:</u> • School projects (n=16) • Collaborating with societal actors (n=2) • Food system topic (n=2) <u>Intrinsic motivation for:</u> • Making a change in the community (n=1) • Introducing new teaching methodologies (n=3) ▪ Working in a team (n=3) ▪ Creating a LL/Being part of the project (n=4) • Motivating students (n=1) • Learning (n=1) • Collaborating with others (n=4) <u>Self-efficacy:</u> • Supportive nature (n=1) • Adaptability (n=2)	<u>Previous experience in school projects (n=11)</u> <u>Already established collaborations:</u> • With societal actors (n=5) • Between the school staff (n=2) <u>Supportive nature towards:</u> • Collaboration with societal actors (n=3) • The SALL project (n=7) • Teaching staff (n=2) <u>Skills:</u> • Management (n=3) • Soft skills (n=1) • Communication (n= 2) • Organization skills (n=1) <u>Content knowledge (n=4)</u> <u>Alignment with the school's curriculum (n=2)</u> <u>Adequate school resources/infrastructure (n=3)</u>	<u>Previous experience in:</u> • School projects (n= 7) • Collaborating with schools (n=3) • Collaborating with students (n=1) <u>Intrinsic motivation towards:</u> • Educating students (n=8) • Collaboration (n=1) • Participating in school projects (n=2) • Promoting health/healthy eating (n=3) <u>Supportive nature:</u> • Towards collaboration (n=6) • Towards students (n=1) • In enlarging the network of the school (n=3) <u>Background knowledge:</u> • Content knowledge /expertise (n=13)

	Background knowledge: • Content knowledge (about the food system) (n=7) • Pedagogical knowledge (n=19) • In involving societal actors (n=5) Personal skills: • Soft skills (n= 4) • Research skills (n=1) • Collaboration skills (n=1) • Communication skills (n=7) • Problem-solving skills (n=5) • Organization - coordination skills (n=8) • Digital skills (n=2)	Available funding (n=1)	• Pedagogical knowledge (n=1) Skills: • Projects' management (n=3) • Communication skills (n=2) Available resources/infrastructure (n=1)
WEAKNE	Lack of previous experience: • LL methodology (n=1) • In recruiting societal actors (n=2) Restrictions:	Lack of previous experience: • Working with societal actors (n=1) • LL methodology (n=1) Lack of connections with societal actors (n=5)	Time constrains/pressures relating to busy schedule (n=6) Lack of organization skills (n=1) Lack of previous experience with school projects (n=1)

S S E S	• Due to time constrains (n=8) • Workload management (n=6) <u>Managing expectations (n=3)</u> <u>Lack of personal skills:</u> • Organization skills (n=4) • Collaboration skills (n=1) • Digital skills (n=6) <u>Fear of not being able to convince others of the project's relevance to their work/lives (n=3)</u> <u>Lack of knowledge in regards to:</u> • The SALL project (n=1) • Content knowledge related to the food system topic (n=8) • Pedagogical knowledge (n=1) • Bureaucracy procedures (n=1) <u>Managing students' needs (n=10)</u> <u>Difficulties in implementing the LL methodology (n=2)</u> <u>Difficulty in communicating to students</u>	<u>Lack of knowledge:</u> • technological knowledge (n=1) • Content knowledge (n=1) • On how to engage with SAs (n=2) • About the LL methodology (n=3) <u>Lack of students' knowledge about the LL (n=1)</u> <u>Openness of the project (n=1)</u> <u>Restrictions:</u> • Limited resources/infrastructure (n=1) • Time constrains (n=1) • Workload management of the staff (n=4) <u>Lack of communication within the staff members (n=2)</u> <u>Managing students' expectations (n=1)</u> <u>COVID-19 related issues:</u> • Online classes (n=1) • f2f interactions (n=1)	<u>Lack of knowledge:</u> • Pedagogical knowledge (n=6) • School curriculum (n=2) • About their role in the project (n=8) • About the LL methodology (n=2) • About working with students (n=2) <u>Lack of digital skills (n=1)</u> <u>Lack of contacts (n=3)</u>

	the LL methodology (n=1) Unsure of projects' impact outside of school (n=1)	• Different learning experiences (n=1)	
OPPORTUNITIES	Gained further experience in school projects' implementation (n=3) Connections of the LL methodology to other ongoing school projects (n=10) Already established collaborations with societal actors (n=2) Students' experience in similar projects (n=1) Students' eagerness to participate (n=11) Increased students' civic awareness (n=1) The school operates with extended hours (n=1) Relevance to the curriculum (n=3) Provision of support by: • the NC (n=1) • the School (n=17)	Connection of LL methodology to other ongoing projects (n=3) Already established collaborations with SAs (n=3) Engagement with real-world issues (n=6) Increased motivation: • By the school (n=3) • By students (n=1) • By teachers (n=2) • By parents (n=2) Open mind-set of the staff (n=3) Connection to the school curriculum (n=1) School resources/infrastructure (n=5) Provision of support by: • The local community (n=4)	Already established collaborations: • With students (n=1) • with teachers/school (n=1) Active engagement and collaboration between the participants of the LL (n=10) Opportunity for raising awareness for: • Health/food consumption (n=3) • Environmental challenges (n=1) Engaging students in real-world issues (n=5) Realization of the schools' reality (n=2) Develop skills and experiences (n=7) Intrinsic motivation: • Towards the project (n=3)

	• the Local community (n=8) • the parents (n=2) • the SALL platform (n=1) School resources/infrastructure (n=6) School's prominent location (n=1) Surpassed COVID-19 barriers (n=2) Productive collaboration between: • Societal actors and the other participants (n=11) • Teachers (n=4) • Schools (n=1) • Teachers and their students (n=6) Long-term implementation of the project due to students' young age (n=1) Opportunity to solve community problems (n=4)	• Parent (n=4) Allocation of working hours for implementing project actions (n=1) School's proximity to SAs (n=1) Productive collaboration amongst staff/Increased teamwork (n=7) Increase of students': • Self-governance (n=5) • Skills (n=5) Ongoing opportunities to enlarge the school's network with: • other societal actors (n=3) • other schools (n=2) • other projects (n=1) Ongoing opportunities in introducing innovative educational approaches (n=4)	• Towards supporting students (n=3) Supportive nature of: • the schools' administration staff (n=2) • the teachers (n=4) • the parents (n=3) • local community/other SAs (n=3) Marketing opportunities (n=4) Connection to the school curriculum (n=1) Close proximity to school (n=1) Future work prospects for students (n=1) Flexibility/adaptation of participants (n=1) Share knowledge and expertise (n=3) Gained new insights about their work (n=1) Ongoing opportunities to enlarge their network by collaborating with: • Other societal actors/community (n=7)

	Ongoing opportunities to enlarge the schools' collaboration network (n=10) Ongoing opportunities in terms of: • Developing positive attitudes (n=2) • Developing knowledge (n=1) • Developing students' confidence (n=1) • Developing pedagogical skills (n=4)		• With parents (n=1) • With the school, teachers and students (n=5)
THREATS	Difficulties in convincing societal actors to participate (n=5) Restrictions posed by: • Time constrains/pressures (n=8) • Workload pressures (n=7) • Students working on other projects (n=3) • By the curriculum (n=1) Ambiguity of project goals (n=2) Lack of resources/infrastructure (n=3)	Collaboration difficulties with societal actors in terms of: • Ensuring long-term engagement (n= 4) • Recruiting societal actors (n=5) • Lacking of interest in participating (n=2) • Interacting with students (n=1) • Providing benefits to societal actors (n=2) Fear on not achieving a high impact project (n=1) Students not realizing the potential impact	No clear framework for their involvement in the project (n=4) Little benefits for participation (n=2) Lack of understanding of the project's goal (n=2) Lack of active participation from other actors (n=1) Lack of students and/or teachers understanding of the organization's work at the initial stages (n=1) Societal actors underestimate students (n=4) Restrictions posed by:

	Students require guidance in carrying out the project t(n=6) Students lack of inquisitive attitude (n=1) Lack of students' experience in recruiting SAs (n=2) Lack of motivation by: • students (n=8) • teachers (n=4) • Societal actors (n=1) No funding (n=2) Change of staff during the school year (n=3) Lack of support: • By NC (n=1) • By other entities/ local community (n=2) Lack of team spirit (n=1) Bureaucracy issues (n=1) Student contributions go unnoticed (n=1) COVID-19 related issues:	of their project (n=3) Difficulties in establishing collaborations: • between teachers (n=1) • Between teachers and students (n=1) Lack of support: • By local community (n=1) • By principal/administration (n=2) Resistance to change by teachers (n=1) Lack of resources/infrastructure (n=3) Lack of motivation (to participate): • By parents (n=1) • By teachers (n=1) No funding (n=5) Restrictions posed by: • Time constrains/pressures (n=4) • Workload pressures (n=3)	• Time constrains/pressures (n=7) • Workload management (n=1) • Conflicts between schools' and SA's schedule (n=4) Fear of not succeeding (n=3) Lack of previous experience in school projects (n=4) Resistance in change of other SAs/community (n=2) Difficulties in collaboration within the organisation/company(n=1) Bureaucracy issues(n=2) Culture differences between schools and Universities (n=1) COVID-19 related issues: • COVID-19 restrictions (n=3) • Delays due to lockdowns (n=2) • Collaboration issues (n=3)

	• Lack of face-to-face communication (n=5) • School closing (n=2) • Social distance (n=4) • Covid-29 Measures (n=1) • School organization (n=2) • Online lessons (n=6)	• Socio/economic problems within the community (n=1) • By school timetable/ curriculum (n=2) <u>COVID-19 related issues:</u> • Collaboration issues (n=2) • Covid-29 Measures (n=2) • Communication issues (n=4) • School organization (n=2)	

STRENGTHS DIMENSION

As shown in Table 15, teachers had the highest participation in the Impact SWOT analysis and as in the Expectancies SWOT analysis, they expressed the most strength-related comments (99 in total), accounting for 49% of the total number of comments in the strengths dimension. Conversely, the school and societal actors made 23% and 28% of the strength-related remarks respectively. The number of dominant categories and the percentage of responses for the strengths dimension per participatory level are presented in the table below:

Table 15: The percentage of responses and number of dominant categories of each participatory level for the Strengths dimension

	Teachers	School	Societal actors
Percentage of comments (n=201)	49%	23%	28%
Number of dominant categories (n>7)	5	2	3

In Table 16, the high frequency categories within the Strengths dimension for the Impact SWOT are presented, along with the high frequency categories of the Expectancies SWOT to facilitate the comparison in their review.

Table 16: Expectancies and Impact SWOT high frequency categories within the Strengths dimension for all participatory levels

		Expectancies SWOT	Impact SWOT
S	**TEACHERS**	Previous experience in: ○ school projects ○ collaborating with societal actors • Intrinsic motivation in introducing new methodologies to their teaching practice • Content knowledge about the food system • Pedagogical knowledge • Personal skills: ○ Ability to collaborate well with other teachers ○ Ability to collaborate well with students ○ Communication skills ○ Problem-solving skills	• Previous experience in school projects • Content knowledge about the food system • Pedagogical knowledge • Personal skills: ○ Communication skills ○ Organization-coordination skills • Schools' supportive nature towards the SALL project • Intrinsic motivation towards educating students

	SCHOOL	• Previous experience in school projects
		• Already established collaborations with societal actors
		• Schools' supportive nature towards:
		  ○ collaboration and
		  ○ the SALL project
		• Adequate school resources/infrastructure
			• Previous experience in school projects
			• Schools' supportive nature towards the SALL project

	SOCIETAL ACTORS	• Previous experience in school projects • Intrinsic motivation towards educating students • Already established collaborations with local community • Content knowledge about the food system	• Previous experience in school projects • Intrinsic motivation towards educating students • Content knowledge about the food system

The statements that are underlined are statements that were included in both the Expectancies and Impact SWOT analysis for each participatory level

It appears that the first four high frequency categories regarding teachers' strengths (i.e., **previous experience in school projects, content knowledge about the food system, pedagogical knowledge and communication skills**) are remained constant from the Expectancies towards the Impact SWOT. Hence, these strengths seem to be of pivotal importance for teachers throughout their participation in the project, since they can maintain or increase their self-confidence and ability in carrying out the project. Also, teachers seem to consider **organization and coordination skills** as important strengths during the implementation of the project, which were not foreseen as a significant aspect of internal origin at the beginning.

As shown in Table 16, the primary categories for the other two levels (i.e., school administrators and societal actors) were also included in the Expectancies SWOT meta-analysis. Even after their participation in the project, the administrative staff emphasized on personal strengths that relate to the **support and facilitation of the school's staff and students** in successfully implementing their project, as well as to the **function of the school community as a collective unit** to promote a positive attitude towards the project. As administrative staff from Estonia reported: "*Since school board was invested and involved, information about the project was easy to communicate*".

Societal actors also considered their **previous experience in school projects** as an important strength, since it supported them in successfully understanding the ways they can actively participate in a school project. Furthermore, they had a **high innate motivation to educate student**s and specifically to provide them with information, guidance and feedback. This attitude shows that external entities are willing to help, support and encourage students, as well as to inspire and be inspired by them. Additionally, societal actors recognized that **their expertise in the food system aided the project** by

allowing them to share their knowledge and experience in methods and solutions for topics related to the food system in a local context.

WEAKNESSES DIMENSION

Table 17 presents the percentage of responses of each participatory level for the weaknesses dimension. Half of the comments were received from teachers, 23% from administrative staff, and 27% from societal actors.

Table 17: The percentage of responses and number of dominant categories of each participatory level for the Weaknesses dimension

	Teachers	School	Societal actors
Percentage of comments (n=119)	50%	23%	27%
Number of dominant categories (n>7)	3	2	1

In Table 18, the high frequency categories within the Weaknesses dimension for the Impact SWOT are presented, along with the high frequency categories of the Expectancies SWOT.

Table 18: Expectancies SWOT and Impact SWOT high frequency categories within the Weaknesses dimension for all participatory levels

		Expectancies SWOT	Impact SWOT
W	**TEACHERS**	• Lack of previous experience in recruiting societal actors • Restrictions due to time constrains • Lack of collaboration skills • Limited digital skills • Lack of knowledge in regard to the SALL project	• Restrictions due to time constrains • Lack of content knowledge about the food system • Managing students' needs
	SCHOOL	• Lack of connections with societal actors	• Lack of connections with societal actors • Restrictions due to workload management of staff
	SOCIETAL ACTORS	• Time constrains/pressures	• Lack of knowledge about their role in the project

**The statements that are underlined are statements that were included in both the Expectancies and Impact SWOT analysis for each participatory level*

As shown in the table above, the Expectancies SWOT high frequency categories differed from those of the Impact SWOT meta-analysis. Specifically**, teachers reported requiring additional time to organize and complete the project in both meta-analyses**. Furthermore, the focus on weaknesses, such as the lack of previous experience in recruiting societal actors or the lack of personal skills (digital

and collaboration skills) were minimized after their participation in the project. However, teachers focused on two other weaknesses**: lack of content knowledge about the food system** and managing students' needs. Teachers reported a lack of specialized understanding of procedure related to the food system (e.g., agriculture). This distinction is further exemplified by teachers' comments: "*…I don't know in which direction it will all develop, I may not be able to answer some [students'] questions, but I hope that then some external educator will*" (teacher from Croatia). Additionally, teachers highlighted the **difficulties they experienced in managing and supporting students' needs.** Teachers reported some instances of students who were unable to fully grasp the project's relevance to real-world situations, and as a result, teachers "*did not know how to guide their students in making their project products more significant in terms of contribution to the community*" (teacher from Israel).

It is proposed that the materials available to teachers during the project include specific suggestions and recommendations on how to support the ongoing participation of students, along with the development or the enhancement of motivation in having an active role in issues that concern their community (i.e., civic engagement). As a Croatian societal actor mentioned, "*I need some guidelines on how best to bring students closer to the problem of food packaging, waste and recycling. Where to start, what task to give them and when*". Furthermore, dissemination materials directly targeting students could help teachers to present to them the SALL project and their potential roles within a LL in an interesting and relevant to their way of living.

Administrative personnel reported as weaknesses, their **lack of connections with societal actors** and the **restrictions due to workload management of the staff**. Indeed, directors and school principals acknowledged the challenges inherent in recruiting and establishing relationships with societal actors. Hence, when participants face this challenge, it is important that the NC supports them by offering ideas and ways for creating relationships and connections to societal actors in a context specific manner (e.g., suggesting specific societal actors that can help, bringing the schools in contact with societal actors that are already motivated to participate etc.). Additionally, a common view amongst administrative staff was that the **high workload of teachers and school staff was restricting their commitment to the project**. One administrative personnel from Estonia stated that "*we have a lot of projects in school, so sometimes it was hard to communicate the Living Lab project specifically*". Showcasing the potential relevance of the SALL project to their ongoing actions (which was also an opportunity stated by teachers, see next section) can minimize this weakness.

Societal actors' most frequently mentioned weakness was their **lack of understanding of what their role should be in the LL project**. For example, societal actors commented: "*I'm not sure how I can really*

contribute to this effort" (Greek societal actor) and "*I don't understand students' emails*" (Dutch societal actor). Hence, it is important for schools to clearly establish when and how a specific societal actor can contribute to their project before recruiting them. An initial discussion of the LL methodology and the expectations of all parties, as well as establishing an ongoing communication between all the participants throughout the duration of the project would also be beneficial. Finally, comparing the two meta-analyses at the level of societal actors reveals that those participating in the project did not feel as restricted by time constraints as they did at the beginning of the project. It can therefore be assumed that the project's methodology intrigued their interest and compelled them to engage and devote their time.

OPPORTUNITIES DIMENSION

The Impact SWOT meta-analysis has revealed several factors that are considered as opportunities from the participants for a successful implementation of a LL project and that relate to the interaction between the different participatory levels. Table 19 presents the percentage of comments in the Opportunities dimension for each participatory level. Teachers mentioned various elements relating to the provision of support and productive collaboration with different entities with 46% of the total number of comments. The school administrators and societal actors garnered 25% and 29% of comments respectively. The opportunities component elicited the most responses, since participants were more vocal in comparison to the rest of the dimensions.

Table 19: The percentage of responses and number of dominant categories of each participatory level for the Opportunities dimension

	Teachers	**School**	**Societal actors**
Percentage of comments (n=254)	46%	25%	29%
Number of dominant categories (n>7)	6	2	3

In Table 20, the high frequency categories within the Opportunities dimension for the Impact SWOT are presented, along with the high frequency categories of the Expectancies SWOT.

Table 20: Expectancies SWOT and Impact SWOT high frequency categories within the Opportunities dimension

		Expectancies SWOT	**Impact SWOT**
O	**TEACHERS**	• Already established collaborations with societal actors • Students' eagerness to participate	• Connections of the LL methodology to other ongoing school projects • Students' eagerness to participate

		• The potential opportunities the project can provide in terms of:
		  ○ Establishing collaborations with societal actors
		  ○ Connecting the LL methodology to ongoing projects
		• Opportunity to solve community problems
		• Provision of support by the school
		• Provision of support by the local community
		• School resources/infrastructure
			• Provision of support by the school
			• Provision of support by the local community
			• Productive collaboration between societal actors and the other participants
			• Ongoing opportunities to enlarge the schools' collaboration network

	SCHOOL	• The potential opportunities the project can provide in terms of establishing collaborations with societal actors • The potential opportunities the project can provide in terms of developing skills	• Engagement with real-world issues • Productive collaboration amongst staff/Increased teamwork
	SOCIETAL ACTORS	• The potential opportunities the project can provide in terms of developing new skills and experiences • Already established projects in relation to the food system within the community	• Active engagement and collaboration between the participants of the LL • Develop skills and experiences • Ongoing opportunities to enlarge their network by collaborating with other societal actors/community

**The statements that are underlined are statements that were included in both the Expectancies and Impact SWOT analysis for each participatory level*

Productive collaboration between societal actors and the other participants was considered to be an important opportunity for all participatory levels and it was a new category appearing in the Impact SWOT. Administrative staff focused mainly on the collaboration between the staff and the rest of the participatory levels on the interaction between all the participants. This indicates that overall, the LL methodology and materials were successful in initiating and supporting the successful interaction between the different participants and this collaboration was significant and valuable for all of them. For example, two societal actors from Estonia stated that "*The opportunity to work with school board, teachers and students was very valuable*".

Furthermore, teachers' opportunities dimension provided the largest set of significant clusters highlighting six primary categories. Three categories that emerged in the Impact SWOT were also apparent in the Expectancies SWOT meta-analysis (i.e., **students' eagerness to participate, provision of support by the school, provision of support by the local community**), revealing the importance of fruitful interaction between the different actors participating in the project. Additionally, teachers were **able to connect the LL methodology to other existing school projects** which was considered as a benefit for them, since the majority of schools appear to have some kind of active project (mainly eco-related) that they could effectively connect to the LL methodology and subsequent actions.

Another new category contributed by administrative staff to the Impact SWOT analysis was their high degree of **excitement while engaging with real-world issues**. Commenting on real-world issues, one of the administrative staff from Estonia said: "*We were able to deal with a real problem in our school and a real thing that needed to be done*". Participants were able to co-operate amicably and "*this had a strong effect on relationships between students, teachers and parents*" (Greek administrator). As one Serbian administrative staff commented: "*The meetings we had as a team contributed a lot to a better understanding of the whole project*".

Moreover, societal actors expressed their active engagement and collaboration between the participants of the LL. Their responses indicate that **societal actors have a better grasp of the interaction between participants and the collaboration with a school**. Furthermore, they were able to **develop their skills and expertise** in terms of food-related knowledge. Societal actors acknowledged the fact that by taking part in the project they were **able to enlarge their network** by collaborating with other societal actors, as well as their local community. For example, a societal actor from Netherlands commented the following: "*Societal actors can also stimulate and inspire each other. Example: on the third day a company came to talk about packaging materials. Another societal actor would have liked to be there, because he was interested in the packaging*". **All these responses could be presented as examples of benefits that societal actors can gain** through their participation in a school project following the LL methodology.

THREATS DIMENSION

The table below provides an overview of the percentage of responses and the number of prominent categories for each participatory level for the Threats dimension. Teachers at a consistent level reported 45% of all threats-related remarks. School administrators and societal actors generated 29% and 26% of responses respectively for this dimension.

Table 21: The percentage of responses and number of dominant categories of each participatory level for the Threats dimension

	Teachers	School	Societal actors
Percentage of comments (n=183)	45%	29%	26%
Number of dominant categories (n>7)	3	2	1

In the table below, the high frequency categories within the Threats dimension for the Impact SWOT are presented, along with the high frequency categories of the Expectancies SWOT.

Table 22: Expectancies SWOT and Impact SWOT high frequency categories within the Threats dimension

		Expectancies SWOT	Impact SWOT

T	**TEACHERS**	• Collaboration difficulties with societal actors
		• Lack of co-operation between peers/school
		• Restrictions posed by:
		  ○ Time constrains/pressures
		  ○ Workload pressures
		• Students require guidance in completing projects
		• Change of staff during the school year
		• Lack of local community support
		• Communication issues due to Covid-19
		• Covid-19 Measures
			• Restrictions posed by:
			  ○ Time constrains/pressures
			  ○ Workload pressures
			• Lack of motivation by students

	SCHOOL	• Collaboration difficulties with societal actors in ensuring active engagement	• Collaboration difficulties with societal actors in terms of recruiting societal actors • No funding
	SOCIETAL ACTORS	-	• Restrictions posed by time constrains/pressures

**The statements that are underlined are statements that were included in both the Expectancies and Impact SWOT analysis for each participatory level*

As seen in Table 22, there are a number of important differences between the Expectancies and the Impact SWOT meta-analysis. Teachers prior to their implementations, anticipated that they may confront collaboration challenges with societal actors; nevertheless, this was not an evident concern in the Impact SWOT. Additionally, they foresaw a lack of cooperation with peers and the school, as well as a lack of local community support which again, were not considered as a threat by teachers by the end of their project. One of the primary threats they stated was a **lack of time owing to workload constraints and timetable conflicts** when trying to meet and interact with external societal actors. Additionally, teachers reported a **lack of motivation by students**, which they attributed mainly to the restrictions imposed due to the covid-19 pandemic. For example, two teachers from Israel stated the following: "*Tiredness and lack of collaboration from the students' side during the covid period, especially due in the framework of online lessons*" and "*Difficulties in involving students after 2 years of covid*". In some instances, lack of students' motivation was observed because "*the subject for the project was chosen by the school team and not by the students – which made it harder for them to connect to the project and decreased their motivation to collaborate*" (teacher from Israel). This was also evident in some of the teachers comments in the case study reports. It seems that teachers consider that the provision of some freedom for students to choose the thematic area/topic they want to work on for their project is of pivotal importance for retaining their motivation.

Even though teachers acknowledged that "*Covid-19 made the project complicated*" (teacher from Netherlands), **they were able to circumvent Covid-19 restrictions** as "*it was a bit easier to cope with the COVID situation and it did not interfere with our work (since we had somewhat gotten used to it*)" (Estonian teacher), and "*students wanted to participate in the project and they were highly collaborating, even during the Covid-19 situation with all the lockdowns" (teacher from Israel).*

Schools reported **challenges in recruiting societal actors** and **finding funding**. Regarding the recruitment of societal actors, school administrators provided the following statements: "*Difficult to get responses from stakeholders/people and organizations that we contacted to be involved with the project*" (Cypriot administrator); "*The school didn't manage to initiate collaboration with the municipality, despite some effort and the fact that it would have improved the project*" (Israeli administrator)*;* and "*Our project was community based, but still a bit too school-centered. Next time, we should try to involve more stakeholders (but it is very difficult)*" (Estonian administrator).

Additionally, societal actors recognized that **developing the project requires a significant amount of time** which might put a strain on the rest of their workload. Furthermore, they reported "*lack of time to test the ideas proposed*" (Greek societal actor) and "*finding a good time when everyone was available was difficult (other availability, travel time, etc.)*" (Dutch societal actor). This finding implies the importance of organization and communication among the participants and the need for provision of sufficient time to all participants to collaborate and develop ideas that are practically applicable.

4.4.4. Synthesis of main finds of the SWOT analyses

The SWOT meta-analyses (Expectancies and Impact SWOTs) set out to identify and analyze participants (teachers, school, societal actors) insights on how the SALL methodology was conceptualized prior to the implementations (after an initial introduction to the project) and to evaluate its impact after the participants' implementations and interaction. This information pinpoints aspects of the SALL methodology that were effective and successful in supporting a school project, as well as the interaction between the participants and also aspects that could be improved or should be taken into consideration when implementing the methodology in the following years. The findings of the SWOT analysis were also used for developing the evaluation questionnaires of the wider community (for more information see Section 5). The main findings of the SWOT analyses are presented below.

As revealed from the number of responses in the SWOT analyses**, teachers were more involved in the project planning and conceptualization process and more eager to express and reflect on aspects** (of internal and external origin) that could possibly facilitate or hinder the successful implementation of their school project. **The administration staff was more focused on practical aspects of the implementation process of the project** (e.g., collaboration among staff, workload management, recruitment of societal actors**). Societal actors also focused mainly on practical issues and concerns prior to their engagement in the project** without taking into too much consideration the benefits of their interaction with other participants. **After their participation, a lot of their statements concerned the benefits of this interaction** indicating the change in their perspective of how they could contribute and benefitted from their participation in LL school projects.

One of the most significant finding emerging from the meta-analyses was that **a number of weaknesses and threats identified by participants prior to their implementations (relating mainly on the difficulties that might emerge from their interaction with others) were no longer major concerns** at the end of their implementations. For example, teachers acknowledged a lack of confidence in communicating and engaging with external entities at the beginning of their project. By the end of the project, they had gained confidence in their ability to collaborate and communicate effectively with societal actors, while organizing and coordinating the whole project. Hence, **it seems that the SALL methodology and relevant materials, as well as the NCs support during implementations, were successful in supporting schools during the recruitment and interaction with societal actors.**

Also, an issue that was raised at the start of the project and was reiterated at the end by all levels of participation was the **issue of time management**, owing to the heavy workloads of both school and societal actors. This finding demonstrates the critical nature of clear and adequate communication among participants, as well as the need of providing sufficient time for all participants to interact and

develop a manageable project. Teachers and administrative staff from all participating countries both frequently stated, at the beginning and end of the project, that their extensive prior experience in similar school projects (e.g., eco-projects, STEAM education projects, open schooling projects) was a source of support and confidence for them during the implementation of the SALL project. Hence, **developing a SALL school project based on the prior experience of participants and/or their ongoing school projects will help minimize any concerns related to the implementation of the SALL methodology** (e.g., connections with the curriculum, workload of participants, lack of content knowledge).

In terms of the **societal actors'** participatory level, t**hey initially expressed apprehension in engaging in a school project** since they lacked an understanding of how schools operate, as well as a lack of pedagogical knowledge. However, through their participation, **they felt that their expertise on aspects related to the food system was used as a vehicle to educating students and this was a sort of motivation for them** to inspire and co-operate with students, teachers, and schools in order to make a significant positive change in the community. Also, societal actors **expressed their satisfaction for being able to develop their educational skills** during the project, which was an initial source of internal insecurity for them. Also, by the end of the project, societal actors **felt more comfortable participating in school projects** as a result of their active participation, engagement, and collaboration with various LL participants. They also appeared to have **gained a better understanding of the interaction and collaboration with a school**, a finding which again demonstrates that building on prior experiences may serve as a springboard for future projects. When the two meta-analyses were compared for this participatory level, it was discovered that participants in the project **felt less confined by time constraints than they did at the beginning**. Additionally, societal actors recognized that by participating in the project, they were **able to expand their network** by collaborating with other societal actors and their local community. **All these findings demonstrate the benefits that societal actors may gain from their involvement in a LL school project.** These in turn can be presented to potential societal actors to convince them to participate during the recruitment process at the initial stages of a school project by schools and/or NCs.

However, the most reported weakness of societal actors at the end of the project was their **lack of understanding of their role in the SALL school project**. Hence, it is critical for schools to define precisely when and how a certain societal actor may contribute to their project prior to recruiting them. It would also be useful to have an initial conversation about the LL methodology and the expectations of all parties, as well as to develop continual contact between all participants during the course of the project.

Another positive aspect expressed by all participatory levels was their high level of excitement, as well as that of their students, when challenged with real-world issues. This excitement led to the increase of students' enthusiasm for participation since they felt they were actively contributing to making a positive change in the community. The present data emphasise on the beneficial contribution of the project to the school community, as it fosters a **culture of collaboration and equal participation** between entities inside and outside the school. Indeed, teachers reported that the school's and community's support fostered constructive cooperation between the participants, as well as productive collaboration within the school staff. However, by the end of the project, students' motivation decreased, and teachers reported difficulties in managing and supporting students' needs. **Allowing students to choose the thematic area/topic of their project - with appropriate guidance- seems to be vital for maintaining their motivation and enthusiasm.** This is also evident in the findings of the students' questionnaires (see Section 4.3).

Overall, the Expectancies and Impact SWOTs collected from all countries have provided us with a clear understanding of the areas in which participants require additional support in order to successfully implement the SALL methodology for inspiring partnerships between schools, teachers, students, societal actors and local communities and also the aspects of the SALL methodology and implementation process that were successful in encouraging participation and sustaining motivation in making a change in the school/community through collaboration.

4.5. Synthesis of findings

The **main objective of the Interim Evaluation Report** was to present the impact of the proposed SALL methodology (see Section 2) on individuals, organisations and the local community involved in the pilot year of the SALL project. Specifically, the evaluation framework of year 1 aimed at **investigating the transferability and adaptation mechanisms that could facilitate and support the effective application of the SALL methodology** in the wider community of year 2 and 3, as well as of other schools and participants in general interested to implement the methodology in their own contexts. The in-depth study of year 1 focused on the collection of feedback in the course of the development and implementation of the SALL methodology as a means to support its **refinement implementation in schools** and also to **create the lighter evaluation process to be used by the wider community** for years 2 and 3.

The in-depth study evaluation framework (see "D5.1. Evaluation Framework" for more details) included the **collection of feedback and data from all participatory levels of a SALL school project** (i.e., students, teachers, administration staff and societal actors) through flexible and practically applicable evaluation methods and tools that could be adapted to different contexts. Specifically, **three evaluation tools** were used which provide the opportunity to collect feedback not only in regard to the impact on each participatory level but also about the interaction among different engaged participants. These are as follows: (i) case study reports for presenting the school projects, (ii) students' questionnaires related to civic engagement and dimensions of science attitudes, and (iii) SWOT analyses to gain an insight on how the SALL methodology was conceived by the teachers, administration staff and societal actors. In total, **104 teachers** from a variety of disciplines (mainly teachers of natural sciences), **42 member of administration staff**, **610 students** and **144 societal actors** from different fields and backgrounds participated in the in-depth analysis of the pilot phase (year 1) of the SALL project. Below, we provide a synthesis of the main conclusions deriving from the analyses.

Based on the case study reports, **the most common topics targeted by schools during their projects concerned the reduction of food waste** (mostly within the school context; e.g., reducing food waste in the school canteen before and after lunch) and **the promotion of healthy eating habits** (e.g., raising awareness for misleading publicity of food). Furthermore, it appeared that **participants followed different LL pathways** (five in total) during the planning stages (phase 1) of their SALL school projects, which differed based on the level of openness of the process they followed; from open exploration pathways (gradual or single-step) to the adoption of pre-defined key aspects of the project (i.e. pre-defined thematic area and/or topic and/or solution). All LL pathways incorporated **three key actions**

which can be considered as milestones: the *definition of the thematic area*[6] (i.e., a general subject of interest related to the food system), the *identification of the topic*[7] (a certain problem related to the thematic area which concerns the context of the local community), and the *identification of a possible solution*[8] (i.e. a selection/identification of a service/product that could improve or solve the topic). These actions take place at different stages of each LL pathway and through these actions the LL participants come to a consensus on what the general aim of their project will be. Also, the definitions of the thematic area, topic and solution mark the initiation of the rest of the actions of the projects which relate to the prototyping, testing and evaluation of the solutions.

The LL pathway a school chose or could potentially choose could be based on different conditions such as the school context, restrictions posed by the curriculum, workload etc., as well as the prior knowledge, experiences and aims of the participants. Since the **Gradual or Single-step Exploration pathways initiated with the "food system exploration" action, the participants had more freedom to connect the aim of their SALL school project to their own interests, expectations and needs.** Hence, participants could potentially develop stronger motivation for on-going participation and engagement. This was also evident in statements posed by teachers in the Impact SWOT showcasing an observed **decrease of students' motivation when aspects of the project (thematic area/topic/solution) were pre-defined by the teacher.** In the Gradual Exploration pathway, the "exploration of the thematic area" followed the "exploration of the food system" to determine the solution. It is recommended that schools wishing to follow one of these two more open LL pathways to make this choice after the "food system exploration" stage; if there is a consensus on the thematic area-topic-solution to be chosen at this stage, then the Single-step Exploration pathway can be followed. If there is not a suggested solution, then the Gradual Exploration pathway can be followed, for the participants to further explore the topic and then identify the solution(s). To encourage the implementation of open exploration pathways, a more in-depth and detailed guidance can be provided to schools in relevant materials (e.g. in the *Roadmap for Schools* document, see D2.3) for strengthening their confidence and motivation.

The rest of the pathways (which entail the definition of the thematic area/topic and/or solution in advance) can be followed **when participants aim to make direct connections** of their project to a specific subject of the school curriculum or to existing actions and goals of the school or focus on the development of specific skills or wish to connect their project to the work/interests of specific societal actors. The definition of thematic area/topic/solution can be made by the teacher, or an administration

[6]Thematic area: a general subject of interest related to the food system (e.g. recycling)
[7]Topic: a certain problem, related to the thematic area, concerning the context of the local community (e.g., there are no recycling bins available in the area of the school)
[8]Solution: a service/product that could improve or solve the topic (e.g., placement of recycling bins in key areas of the school and inform students and staff about this action)

staff or a societal actor. Projects following the actions of these pathways **tend to require less time** and have **predefined steps and strategies** that can be followed by participants, as well as **easy defined roles of participants** that can undertake. Also, these pathways **can potentially support schools that are considered as beginners in the open-schooling arena**, and facilitate the collaboration with external stakeholders.

Based on the results of students' questionnaires, it seems that **the "gradual exploration LL pathway" offered to students the most opportunities for developing their science attitudes during the implementation of their project**, whereas the "single-step exploration pathway" had a counteractive effect. Also, participants involved in projects following **the "gradual exploration pathway" managed to engage societal actors mostly at a co-construction level** (i.e., highest level of involvement). Based on these findings, it is suggested that **when open approaches towards the SALL methodology are followed, a gradual exploration of the key aspects of the project is chosen**, along with the support of societal actors (for example by adding an additional exploration stage in the project). If participants are inexperienced with open-schooling approaches and/or open-ended project-based learning, the "pre-defined thematic area and/or topic pathways" can be selected. These pathways also provide opportunities for active involvement of participants. It is noted that based on the findings that are presented in this Deliverable, **the highest level of involvement (i.e., co-construction level) was reached by the societal actors who were involved in the "pre-defined thematic area and topic" pathway.** However, it was found that pre-defining key aspects of the project can lead to a decreasing motivation of students (as reported in the Impact SWOT analyses) and thus, allowing students to choose at least one key aspects of their project - with appropriate guidance based on their prior experiences - seems to be vital for maintaining their motivation and enthusiasm.

After the planning stages of the project, schools continued with the implementation of their solution by developing their prototypes (**41 prototypes in total**; physical, digital and/or a service prototype). Information about the types of prototypes developed by students, the ways they tested them, and the participants/users involved in the testing process are provided in Section 4.2.2. This information can serve as examples of good practice and ideas for schools that wish to follow the LL methodology for targeting topics such as those of the focus schools.

Based on the SWOT analyses, **the number of weaknesses and threats identified by participants prior to their implementations** (related mainly with the difficulties that would emerge from their interaction with others) **were no longer major concerns at the end of their implementations**, which indicates that the SALL materials and methodology, along with the support from the NCs, were successful in supporting most schools in establishing productive collaboration channels among participants with different backgrounds, goals, age etc. However, an issue that was raised at the start of the project and

was reiterated at the end by all levels of participation was **the issue of time management**, owing to the heavy workloads of both school and societal actors. This finding demonstrates the critical nature of clear and adequate communication among participants, as well as the need of providing sufficient time for all participants to interact and develop a manageable project. **Developing a SALL school project based on the prior experience of participants and/or their ongoing school projects appeared again to be a way to eliminate any concerns** related to the implementation of the SALL methodology (e.g., connections with the curriculum, workload of participants, lack of content knowledge).

In terms of the **societal actors'** involvement, they initially expressed in the Expectancies SWOT analysis their apprehension in engaging in a school project since they lacked an understanding of how schools operate, as well as a lack of pedagogical knowledge. However, through their participation, they felt that **their expertise on aspects related to the food system enabled them in educating students** and this was a sort of motivation for them to inspire and co-operate with students, teachers, and schools in order to make a significant positive change in the community. They also stated **other benefits** (e.g., development of pedagogical knowledge and experience) they gained during their involvement in school projects in the Impact SWOT analysis, which **can serve as suitable and convincing examples that schools and NCs can utilize for recruiting potential collaborators**. However, **the most commonly reported weakness of societal actors was their lack of understanding of their role in the SALL school project**. Hence, it is critical for schools to define precisely when and how a certain societal actor may contribute to their project prior to recruiting them. It would also be useful to have an initial conversation about the LL methodology and the expectations of all parties, as well as to develop continual contact between all participants during the course of the project. The WP3 deliverables include suggestions and practices that participants and NCs can employ for a successful collaboration between different parties. The findings of the SWOT analyses can inform relevant support materials and practices. They also pinpoint on instances for which participants and/or NCs will probably need to foreground or get more in-depth guidance for.

Overall, based on the findings of the Interim Evaluation Report**, the SALL methodology was particularly successful in supporting the collaboration and productive interaction among the participants of a LL and to facilitate the development of an open-schooling project.** The SALL methodology seems to be a promising approach for encouraging school members to be active contributors within their local community and for external societal actors to be part of the school life and culture. This in-depth analysis provided some insights on aspects of the methodology that could be refined and impacted on identifying successful aspects and practices that could be employed during the wider implementations of the SALL project and other future open-schooling projects following the suggested methodology.

5. Evaluation procedures of the wider SALL community (year 2 & 3)

During the next years of the SALL project a flexible and practically applicable evaluation process with a **lighter core element of evaluation tools** than the in-depth study of year 1 will be developed and applied for identifying the impact of SALL project on the wider community. The development of these tools was based on the initial planning presented in Evaluation Framework (D5.1) by also considering the findings of the in-depth study, the feedback and suggestions of the NCs and participants, as well as the large number of participants. Hence, **the main data source will be participants' responses in questionnaires** that were developed and will be implemented following a pre-post design. For triangulation purposes, data from the school's projects presented on the SALL community platform will be used if needed. Below, the process of developing the evaluation tools is provided, along with the relevant protocol of conduct and the data analysis.

5.1. Development of the evaluation tools

The questionnaires for teachers, school and societal actors were developed based on the SWOT analyses and specifically, the main trends identified for each participation level. During the 3rd project meeting (Greece, 8th-9th of September 2021) an interactive workshop was organized for NCs to review the draft version of the questionnaires and provide suggestions for changes/additions. Following this refinement, a second round of feedback was implemented during which NCs provided their final input. The main objective of these questionnaires was to identify whether similar trends in the beliefs of the participants continued to exist concerning all the domains of the SWOT analyses (i.e. strengths, weaknesses, opportunities and threats) after the refinement and enrichment of the SALL methodology during year 1 (as a result of the in-depth study and NCs and participants feedback). **Thus, the data that will be collected through the questionnaires will enhance our understanding about whether the optimization of the SALL methodology was successful, and also whether the threats and weaknesses of the implementation of the SALL methodology in a school setting were minimized.**

All the questionnaires follow the same format and are divided in three sections:

1. Demographic information (gender, type of company for the societal actors' questionnaires, subject domain for the teachers' questionnaires and name of school and grade for students' questionnaires),
2. Steps for developing a personal code (in order to be able to make pre and post comparisons of teachers' answers and also to keep the questionnaires anonymous) and
3. Main body of the questionnaire including items in Likert scale (1=strongly disagree, 5=strongly agree).

The teachers', administration staff and societal actors' questionnaires were developed primarily based on the high frequency categories of the Expectancies SWOT meta-analysis (see Section 4.4.2 for details) (pre-questionnaires) and of the Impact SWOT meta-analysis (post-questionnaires, see Section 4.4.3 for details).

Teachers' pre- and post-questionnaires (see Appendix 6.2.1 and 6.2.2 respectively) include 20 items each, which correspond to specific SWOT dimensions (see Table 23). Items that measure the same aspect of teachers' view (SWOT dimensions) have been integrated in both pre- and post- questionnaires for obtaining comparable data.

Table 23: The four dimensions measured in the teachers' pre- and post-questionnaire and the corresponding to the SWOT dimensions items

Items of the pre-questionnaire	Items of the post-questionnaire	SWOT dimensions
1, 2, 3, 4, 9, 10, 11, 12	1, 2, 3, 4, 5	Strengths
5, 6, 7, 8, 13,	6, 7, 8, 9, 12, 13	Weaknesses
14, 15, 16, 17	10, 11, 14, 15, 16, 17	Opportunities
18, 19, 20	10, 12, 18, 19, 20	Threats

School administrators' pre- and post-questionnaires (see Appendix 6.2.3 and 6.2.4 respectively) include 19 items related to the SWOT's four dimensions (see Table 24). The following items are the same in both questionnaires: 4, 5, 8, 9, 11, 12, 13, 14, 16, 18.

Table 24: The four dimensions measured in the school administrators' pre and post-questionnaire and the corresponding items

Items of the pre-questionnaire	Items of the post-questionnaire	SWOT dimensions
1, 2, 3, 4, 5, 6, 7, 8	1, 2, 3, 4, 5, 8	Strengths
9, 10, 11	6, 7, 9, 19	Weaknesses
12, 13, 14, 15	10, 11, 12, 13, 14, 15	Opportunities
16, 17, 18, 19	16, 17, 18	Threats

Pre-and post-questionnaires of societal actors (see Appendix 6.2.5 and 6.2.6 respectively) include 18 items corresponding to the four dimensions included in the SWOTs (see

Table 25). Statements that are identical in both questionnaires are items: 3, 5, 9, 11, 12, 14, 15, 16.

Table 25: The four dimensions measured in the societal actors' pre and post-questionnaire and the corresponding to the SWOT dimensions items

Items of the pre-questionnaire	Items of the post-questionnaire	SWOT dimensions
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 18	1, 2, 4, 5, 6	Strengths
11, 12, 17	3, 9, 11, 12	Weaknesses
14, 15, 16	7, 10, 13, 14, 15, 16	Opportunities
13	8, 17, 18	Threats

The **"Students' Attitudes and Civic Engagement Questionnaire"** was developed by considering the findings of the in-depth study, the feedback received by participants through the case study reports, and also the feedback and suggestions of the NCs through two rounds of feedback (same process as for the rest of the questionnaires). It was decided that a more compact version of the questionnaires of year 1 will be developed by omitting the evaluation dimensions that were considered by the NCs as less relevant to the project's goals (i.e., career motivation, self-determination, attitudes towards practical work in science), and also statements that were perplexing for students to comprehend either due to their country's context or due to their age. The questionnaire is available in the Appendix 6.2.7. The main body of the questionnaire includes 23 items which correspond to a specific dimension (see Table 26).

Table 26: The four dimensions measured in the students' questionnaire and the corresponding items

Items	Dimension
1, 2, 4, 7, 11	Intrinsic motivation
3, 6, 8, 10, 13	Self-efficacy
5, 9, 12, 14, 15	Attitudes towards science outside of school
16, 17, 18, 19, 20, 21, 22, 23	Civic engagement

Since the previously mentioned questionnaire concerns the attitudes and civic engagement of students, it was decided that an additional students' questionnaire (called **"Students Beliefs towards the SALL project"**) would be developed in order to identify the impact of other aspects of the project as well

(e.g., interaction with societal actors, LL methodology). The questionnaire, which includes 15 items, was developed using participants' responses from the case studies and, in some cases, comments and quotes from the SWOT analyses. The questionnaire will be administered only as a post questionnaire (since most of the items concern the impact of the SALL project) to a number of schools chosen randomly (the "Students' Attitudes and Civic Engagement Questionnaire" will be administered as a pre). The questionnaire is available in Appendix 6.2.8.

5.2. Protocol of conduct

Wider community. The questionnaires will be administered before (pre) and after (post) the schools' implementations. Specifically, a questionnaire will be administered to a participant before the start of his/her participation and at the end of his/her participation in the project. Hence, the completion of the questionnaires can be done at different times during a school's implementation depending on when participants begin and end their involvement in the school project. It is noted that an initial familiarization with the project's goals and methodology will be needed (e.g., through disseminating relevant materials, participating in a workshop, etc.) before the administration of the questionnaires for all participatory levels. The questionnaires can be provided in paper-and-pencil format or in digital form (e.g., with the use of digital tools like Google forms or LimeSurvey). The format of the questionnaires and the way they will be administered can be chosen by the NC and/or the participants. It is estimated that it will take approximately 15 minutes for participants to fill in the respective questionnaire.

Focus schools. The participants of year 1 that will continue their participation in the project will follow the same evaluation processes as the new participants of the wider community, given that modifications to the methodology and additional tools and materials will be provided. Nevertheless, in order to identify whether students' attitudes and civic engagement are being endured/enhanced through the continuation of their participation in the SALL project, a repeated-measures process will be followed for this participatory level: the students that remain the same for year 2 and/or 3 will be administered the two questionnaires used in year 1 (in-depth study) only as a post (end of the project). Students that start their participation in the project during year 2 will follow the evaluation procedures of the wider community (i.e., administration of the "Students' Attitudes and Civic Engagement Questionnaire" as pre and administration of the same questionnaire as post apart from some random schools chosen which will fill in the "Students Beliefs towards the SALL project Questionnaire").

NCs will provide the raw data (i.e., responses to each item of the questionnaire) in an Excel file for each participatory level (pre and post). Statistical analyses with the use of the IBM SPSS Statistics software will be performed for analyzing the data and identifying the project's impact on each participatory level.

6. Appendices

6.1. Examples of case study reports per country

6.1.1. Case study report of "The International School of Paphos", Cyprus

General Information

Country: Cyprus, Paphos

Name of the school: The International School of Paphos

Number of teachers who participated in this project and their subject domain:

Science teacher (also the coordinator of the eco-school initiative)

Number of administration staff who participated in the SWOT and their position (e.g. principal): Admissions Officer

Number of societal actors and the type of organization (e.g. parents, local producers) who participated in this project: 6 sponsors (patisserie, pharmacy, vegetables & fruits market, garden maintenance services, car importer company, parents and the teachers' association), one artist, the town hall, parents, University of Cyprus (national coordinator)

Starting point

The teacher who coordinated the project firstly participated in the SALL workshop organized by the National Coordinator (University of Cyprus) during which an initial discussion regarding the project the school could undertake took place. The teacher and the school in general were familiar with the implementation of environmental projects since their school is involved in the eco-schools initiative (i.e. a school that implements different actions related to environmental issues). However, it was their first time to be introduced to the LL approach. The school had already some plans for actions related to the food system that they decided they will re-approach through the LL methodology. Support was requested from the National Coordinator in regards on how to enhance their ideas with key aspects of the LL methodology.

Aims

The school's overall goal was to raise awareness concerning key environmental problems (e.g. plastic pollution, food wastage) and promote collaborative work for these issues by involving the local community. Hence, the school organized an eco-challenge month during which challenges/actions related to different environmental problems took place in the school and the local community in collaboration with different societal actors (e.g. parents, the town hall, artists, sponsors). This project involved all 850 students of the school, from reception to year 13. For a month, the students worked in cooperation with their teachers, their families and the local community on the implementation of different actions like tree-planting, construction of a metal turtle functioning as a recycling bin, development of a mobile application to minimize food wastage, tasting of fruits and vegetables, sale of ecological products and donation of their garden's products to families in need.

Societal actors

1. Sponsors [sharing level]: To achieve their goal of raising awareness concerning environmental problems through different actions, students decided to contact companies that are in the local area of the school to sponsor them with money or different products. The sponsors they managed to find were:

- Milrose Patisserie: Donated sweets to raise money for the metal turtle and sponsored a tree.
- Amaryllis Petinou Pharmacy: Donated products that are eco-friendly to raise money for the metal turtle and sponsored a tree.
- Allion Vegetable & Fruits Co Ltd: Donated individually packed fruit and vegetables for tasting for the students.
- JK Garden Maintenance services: Offered guidance to the students for how to look after plants and helped them to transform their school to a greener space.
- Pan Motors - Luxury used cars
- Parents and Teachers Association of the school: Sponsored 5 fruit trees for the school garden and soil for every child to have his/her own pot with a plant to take care of at home.

2. Artist [co-construction level]: The students came in contact with an artist for helping them create the metal construction that will function as recycling bin in their community. They discussed about the shape of the metal construction and after deciding on the details the artist created a metal construction in the shape of a turtle.

3. Town hall [co-construction level]: The students discussed with the town hall about the location where they could place the turtle construction for recycling plastic bottles. They decided to place it in the school yard to be used by the students. They are also planning to cooperate next school year with the town hall for placing similar constructions for recycling purposes in other areas of their city as well.

4. Parents [discovery level]: Students' parents were invited to the different events of the eco-challenge month to promote the spirit of environmental awareness to the wider community. For example, science teachers invited the Parents Teachers Association to visit the school garden where they could see the trees, flowers, herbs and vegetables planted, the pond built and a collection of Cypriot stones.

Moreover, parents were informed through social media (school's facebook page) about the different actions that took place throughout the eco-challenge month. You can see some examples of posts here: https://www.facebook.com/ISOPofficialPTA/posts/262716722208843 , https://www.facebook.com/ISOPofficialPTA/posts/267884948358687

Visit of Parents and Teachers Association to the school garden

5. Research in Science and Technology Education Group (ReSciTEG) [co-construction level]: The teacher requested support from the National Coordinator in regards on how to enhance their ideas with key aspects of the LL methodology. The Cypriot NCs provided their knowledge and expertise by suggesting

good practices for implementing a LL project and mainly on how to engage societal actors and create a prototype.

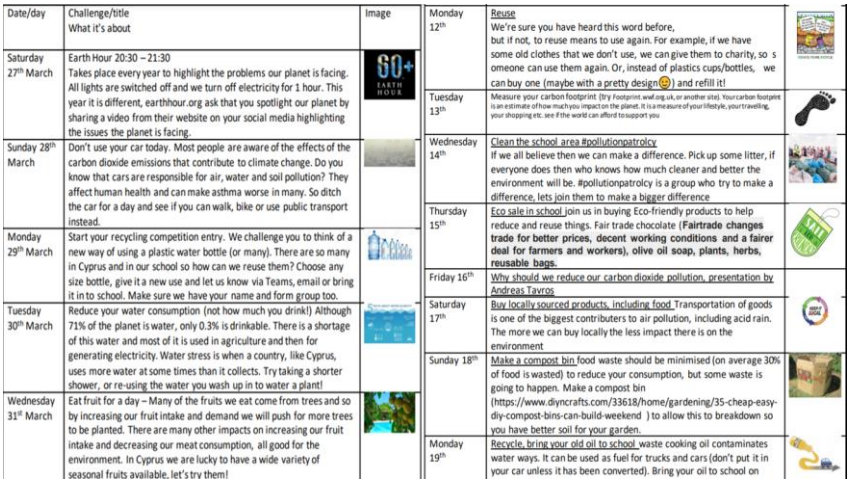
Implementation

Identifying a problem - conceptualizing their goal

At the initial stages of the planning process, the teacher informed the principal of the school about the SALL project. Together they discussed ways in which they can include the LL methodology in their already planned actions that were related to the food system. Then, they requested support from the National Coordinator in regards on how to enhance their ideas with key aspects of the LL methodology. The National Coordinator supported them on how to engage different societal and on how to proceed with the prototyping process. The school set the overall goal for this school year to raise awareness concerning environmental problems (e.g. plastic pollution, food waste) and to promote collaborative work for issues concerning the local community. They wanted to engage all 850 students of the school in some way from reception to year 13. Hence, they decided that the best way to achieve maximum engagement would be to create an eco-challenge month during which students could design and participate in different actions that would take place each day. Finally, the teacher introduced the overall aim for this school year to the students and also presented the SALL project to them.

Implementation - establishing collaborations

After deciding on their aim, all the school community suggested ideas for different eco-challenges/actions to take place in the school community for a month. Their planning is presented in the picture below:



Date/day	Challenge/title What it's about	Image
Saturday 27th March	Earth Hour 20:30 – 21:30 Takes place every year to highlight the problems our planet is facing. All lights are switched off and we turn off electricity for 1 hour. This year it is different, earthhour.org ask that you spotlight our planet by sharing a video from their website on your social media highlighting the issues the planet is facing.	
Sunday 28th March	Don't use your car today. Most people are aware of the effects of the carbon dioxide emissions that contribute to climate change. Do you know that cars are responsible for air, water and soil pollution? They affect human health and can make asthma worse in many. So ditch the car for a day and see if you can walk, bike or use public transport instead.	
Monday 29th March	Start your recycling competition entry. We challenge you to think of a new way of using a plastic water bottle (or many). There are so many in Cyprus and in our school so how can we reuse them? Choose any size bottle, give it a new use and let us know via Teams, email or bring it in to school. Make sure we have your name and form group too.	
Tuesday 30th March	Reduce your water consumption (not how much you drink!) Although 71% of the planet is water, only 0.3% is drinkable. There is a shortage of this water and most of it is used in agriculture and then for generating electricity. Water stress is when a country, like Cyprus, uses more water at some times than it collects. Try taking a shorter shower, or re-using the water you wash up in to water a plant!	
Wednesday 31st March	Eat fruit for a day – Many of the fruits we eat come from trees and so by increasing our fruit intake and demand we will push for more trees to be planted. There are many other impacts on increasing our fruit intake and decreasing our meat consumption, all good for the environment. In Cyprus we are lucky to have a wide variety of seasonal fruits available. let's try them!	

Monday 12th	Reuse We're sure you have heard this word before, but if not, to reuse means to use again. For example, if we have some old clothes that we don't use, we can give them to charity, so s omeone can use them again. Or, instead of plastics cups/bottles, we can buy one (maybe with a pretty design) and refill it!	
Tuesday 13th	Measure your carbon footprint (try Footprint.wwf.org.uk, or another site). Your carbon footprint is an estimate of how much you impact on the planet. It is a measure of your lifestyle, your travelling, your shopping etc. see if the world can afford to support you	
Wednesday 14th	Clean the school area #pollutionpatrolcy If we all believe then we can make a difference. Pick up some litter, if everyone does then who knows how much cleaner and better the environment will be. #pollutionpatrolcy is a group who try to make a difference, lets join them to make a bigger difference	
Thursday 15th	Eco sale in school join us in buying Eco-friendly products to help reduce and reuse things. Fair trade chocolate (**Fairtrade changes trade for better prices, decent working conditions and a fairer deal for farmers and workers), olive oil soap, plants, herbs, reusable bags.**	
Friday 16th	Why should we reduce our carbon dioxide pollution, presentation by Andreas Tavros	
Saturday 17th	Buy locally sourced products, including food Transportation of goods is one of the biggest contributers to air pollution, including acid rain. The more we can buy locally the less impact there is on the environment	
Sunday 18th	Make a compost bin food waste should be minimised (on average 30% of food is wasted) to reduce your consumption, but some waste is going to happen. Make a compost bin (https://www.diyncrafts.com/33618/home/gardening/35-cheap-easy-diy-compost-bins-can-build-weekend) to allow this to breakdown so you have better soil for your garden.	
Monday 19th	Recycle, bring your old oil to school waste cooking oil contaminates water ways. It can be used as fuel for trucks and cars (don't put it in your car unless it has been converted). Bring your oil to school on	

Eco-challenges Ideas

Thereafter, different societal actors that could potentially be involved in the project and the different ways through which they could support their endeavour were identified. Their initial goal was to find actors in their local community that could sponsor some their actions with money or products. They also approach the town hall and an artist for supporting the creation of a recycling bin in the area. They also decided to involve the parents by frequently disseminating the eco-challenges and related information for related environmental issues through social media and invitations for participating in some of the eco-challenges.

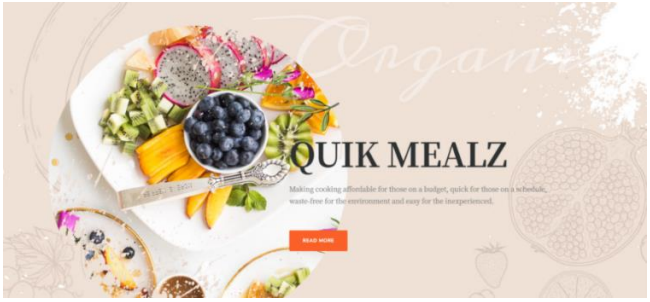
Implementation - creating a prototype (service)

The eco-challenge month took place from 27th of March till 28th of April. During this month the teachers, the students, and their families worked together on the implementation of the following activities:

- They introduced the recycling turtle called Kosmas during Earth hour (27th of March), to mark the start of the eco-challenge month. The turtle was placed inside the school area to encourage students to throw their plastic waste in there for recycling purposes. The school raised money for the construction of the turtle from different sponsors and an artist constructed the bin (see picture below).

The recycling bin (Turtle Kosmas) placed in the school yard

- They launched the app "Quick Mealz", which is ready to be downloaded, the main purpose of which is to minimise food waste.



The first page of the Quick Mealz app

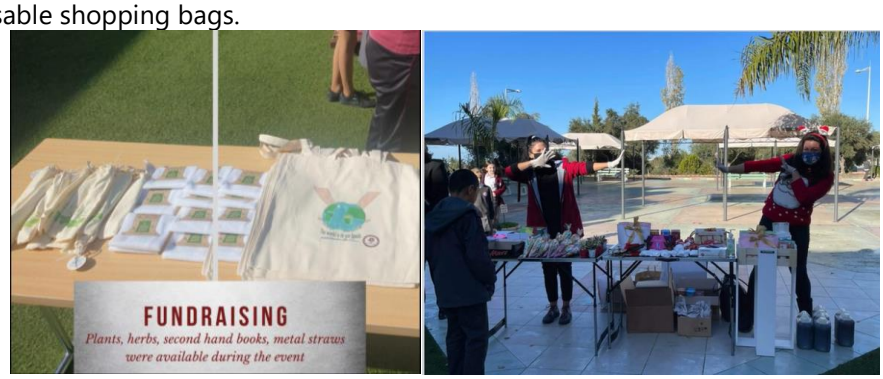
- They created a small green area near their school (in order to involve their community more) and installed a water system. During the creation process different sponsors provided plants or money and people from the community helped. The trees that were planted are mainly orange and lemon trees. Their plan is to donate their produce to people in need. The opportunity was provided to students to planted vegetables, trees, and flowers in the green area and also, they took a plant home. JK Garden Maintenance services offered guidance to the students on how to look after their plants and helped them to transform their school to a greener space. In addition, the Parents and Teachers Association visited the school garden after its transformation.

Transformation of the school garden

- They hosted a tasting of fruits and vegetables for students which were sponsored by Alion Vegetable & Fruits Co Ltd.

Eco-friendly lunch box with fruits and vegetables

- They had an eco-sale with herbs from their garden, tea made from these herbs, metal straws and re-usable shopping bags.



Eco-sale

Reflection (of the national coordinator and of the participants)

Some of the societal actors who got involved in the project mostly had a supporting role through sponsoring or helping in events. Moreover, the societal actors got involved in the project after the main aim was finalized, a choice which does not necessarily reflect the key principles of the LL methodology. In the future, the societal actors could get involved in more phases of the project at an earlier stage e.g. forming of the idea in order to be more engaged in the project.

The LL project helped in supporting all the different personalities, goals, and needs of the students. Students were given the opportunity to make their own choices for the project and in that way, they increased intrinsic motivation, and put in more effort to design and implement all these actions—an ideal recipe for better learning outcomes.

Future Plans

The Living lab of this school has already created a plan for continuing their participation in the SALL project during the next two years. Their future plans are the following:

- Add metallic containers for recycling in other parts of Paphos
- Develop green areas around the school

- Donate to those in need e.g., donate the vegetables and herbs they planted on their "restore our earth filed trip" to a family that has lost their house from the fire
- Increase awareness about the environment through dissemination of their actions e.g. implementing again the eco-challenge month
- Implicate more companies / collaborations

6.1.2. Case study report of the " CED Pina Manique - Casa Pia ", Portugal

General Information

Country: Portugal

Name of the school: CED Pina Manique - Casa Pia

Number of teachers who participated in this project and their subject domain:

1, biology teacher

5, physical education teacher

Number of administration staff who participated and their position (e.g. principal):

1, School Headmaster

Number of societal actors and the type of organization (e.g. parents, local producers)

who participated in this project:

1, organization responsible for promoting zero waste lifestyle

1, organization responsible for providing meals to the school canteen

1, organization responsible for rescuing food to those who need it

1, parish council

Starting point

This school had already participated in other European projects linked to the open schooling approach, such as March - Make Science Real in Schools and OSOS - Open Schools for Open Societies. Teacher Margarida Zoccoli, who has participated in these projects, and has a great experience in engaging students in project-based learning programs, was responsible for the involvement of other Casa Pia teachers in SALL project. Teacher Margarida Zoccoli has also a good experience in developing school projects related with food systems, but did not have prior knowledge on living-lab methodologies. At the beginning of the project, the National Coordinator (Ciência Viva) organized two webinars (1,5-hours each) aiming at explaining the living-lab approach and detailing the different steps, as well as a 3-hours online training session on food systems. Teachers from Casa Pia were present in these three initiatives.

Aims

The main objective of this SALL project, as designed by all intervenients, was to reduce food waste in the school canteen, both before and after the meals take place. Other goals, which will be thoroughly worked in the next school year, are related with promoting healthy eating habits and increasing the fruit supply in school. These themes are closely linked to the daily lives of students.

Societal actors

1. Maria Granel
Maria Granel, a chain store specialized in selling waste zero products and promoting waste zero living habits (through workshops, training, etc.), contributed with expertise and feedback related to the project, by providing information on decreasing food waste and replacing single use packages for waste zero options.

2. Gertal

Gertal, the company that supplies food to the school canteen, contributed with expertise and feedback related to the project, by providing information on food transport and preparation, as well as on food waste management.
By the end of the pilot phase, other two other societal actors were involved: Junta de Freguesia de Belém (the local parish council) and Re-food (a NGO dedicated to provide good rescued food to those who need it in the same communities where the food is rescued). Their participation will be more active in the next school year, when this project will continue to be developed.

Implementation

Introducing the theme

At the beginning of the project, the teachers introduced the general theme of food systems to the students (c. 70) and general school community, through a World Café event, with the main title of "The importance of food for my health and for the health of the planet". In this World Café each table had to discuss one of the following issues: animal rights; food seasonality; food advertising; methods of producing vegetables; food waste (before and after reaching the plate); food packaging and processed foods. The head master of the school was also present, actively participating in this World Café.

World Café to introduce the theme in the school

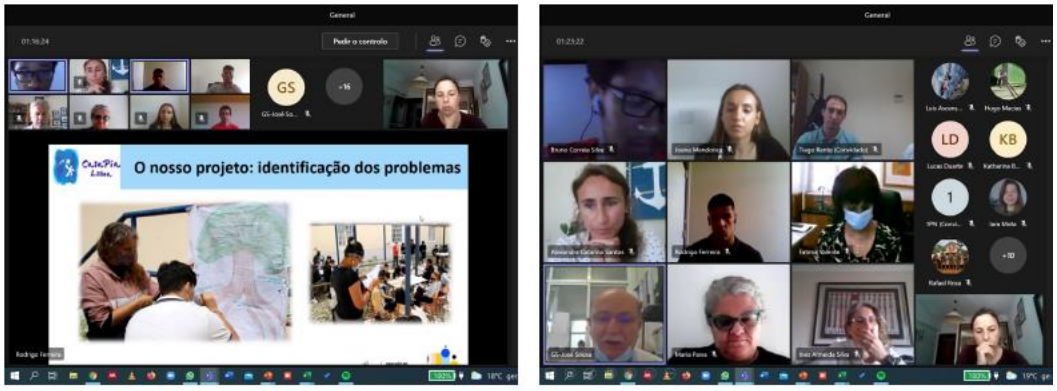
Exploring the theme

From this stage onwards, societal actors Maria Granel and Gertal were engaged in the project. The school organized another event with the purpose of giving the stage to students (and other elements of school community) to discuss the findings from the previous World Café and to choose the problem(s) to be address and to be solved. The event took place in the National Day Against Obesity (18th May) and featured a blind test competition on fruits and vegetables. After a debate, the students presented suggestions for topics that they would like to develop, in order to improve the school's food systems. The most voted projects were chosen: food in the school's cafeteria and bar; food waste before serving and food waste after serving. A large problem tree was drawn to explore the above problems, and afterwards students wrote the name and the class in the theme they prefer to work on.

Meeting where the school community discussed problems and solutions in detail

Engaging societal actors

The school organized an online meeting with the presence of the societal actors that were already participating in the project (Maria Granel and Gertal) and the new additions (Re-food and the Parish Council). Teachers, students and a representative of the school board were also present. The project was discussed among all participants and it was decided to start testing the solutions, by developing prototypes, in the beginning of the next school year. Also, another meeting was scheduled for September.



Online meeting with the societal actors

Reflection (of the national coordinator and of the participants)

As NCs we observed that teachers in Casa Pia were very well aligned in the strategy to follow for the implementation of the school project. Teachers actively participated in our webinars and training session, increasing in this way their knowledge on food system and living-lab methodology. During this pilot year, teachers frequently contacted us both for share the work done in the different stages of the project, but also to clear some doubts. Teachers shared with us how the project is motivating and enthralling students. Accordingly, with teachers' testimony, many of the students are experiencing for the first time the possibility of doing by themselves something very practical, linked to the real world, which could change their everyday school life.

Future Plans

This particular SALL project is going to continue in the next school year, starting in the point it was left: prototype development. The same teachers are going to participate, and also almost the same students. New students will also be able to enter the project. Since there are many students participating in the project (around 50) it will be possible to test different solutions, by developing different prototypes, with students divided into different working groups.

6.1.3. Case study report of the school " Christelijk Lyceum Veenendaal ", Netherlands

General Information

Country: The Netherlands

Name of the school: Christelijk Lyceum Veenendaal

Number of teachers who participated in this project and their subject domain: Five teachers, in the subjects Physical Education (2), Mathematics and Economics (2)

Number of administration staff who participated in the SWOT and their position (e.g. principal): Two people, the team leader of the mavo department (voorbereidend middelbaar beroepsonderwijs; literally "preparatory middle-level applied education") and the Coordinator of the Economics & Social Business stream

Number of societal actors and the type of organization (e.g. parents, local producers) who participated in this project: Two local catering businesses, the caterer of the school's canteen, canteen for a local sports establishment, local supermarket, local business that produces packaging and disposables, local snackbar

Starting point

The school:
Had a strong desire to work more closely with external stakeholders;
Had many years of experience in organizing extracurricular activities and talent groups, and had gained many contacts in the course of this process;
Students:
Were in a stream that prepares them for further training in vocational education. As a result, they were more motivated for practical work than for purely theoretical work.
Teachers:
Were experienced in starting new projects within the school;
Were open to new challenges or opportunities;
Were experienced in collaborating with other teachers and stakeholders;
A new idea began to grow among the teachers of the school to give students more autonomy, and this project offered them an opportunity to do so;
Had many external contacts that could act as Societal Actors (SAs).

Aims

The main objective of this project was: To gain insight into the world of catering and how young people are or can be involved in sustainable and environmentally conscious food.

Societal actors

The different societal actors were mainly used to gather more information about the topic, and were less involved in the actual creation process. Thus, all societal actors were involved in a 'sharing' capacity.

Implementation

Phase 0: Preparation
The project coordinator worked together with the vmbo-t (specific level in Dutch secondary education, which lasts a total of 4 years and upon completion gives access to further education in vocational training) grade 3 teachers to design various tasks within the project. They also ensured that a number of stakeholders were able to work within the project themselves beforehand.

Phase 1: Implementation
The project was divided into three separate days, distributed over the course of three weeks, with one project day per week. They chose this approach because they felt that giving the students a lot of freedom here, would probably not result in the desired outcome. This assumption was based on the teachers' experience working with this particular group of students. During these three days, the students were given small, structured tasks that had be completed within a certain amount of time on that day. Within these tasks, the first three steps of the SALL methodology were implemented. On the last day, the project was evaluated.

On the first day, the students:
- Listened to presentations from different stakeholders where they learned about working in catering and sustainable food (co-creation);
- Worked on defining the specific issue to be worked on during the project (co-creation);
- Prepared interview questions for their interview with other stakeholders (either those provided by the school or those whom the students themselves came into contact with) (co-creation);
- Conducted their interviews and recorded the data that resulted from these interviews (co-creation).

On the second day, the students:
- Processed the information they gathered from the Stakeholders during day one using the 'starbursting' method, and pitched their information to one of their teachers (exploration);
- Brainstormed about making a healthy lunch (exploration);
- Listened to a talk from a Supermarket employee about healthy products available in the supermarket (exploration);
- Prepared in groups a healthy and sustainable lunch for another group (experimentation).

On the third day, the students:
- Prepared questions about sustainable packaging (exploration)
- Received a talk about sustainable packaging by a representative of a packaging supplier (co-creation)
- Brainstormed ideas for sustainable packaging (exploration);
- Prepared and held a presentation about their ideas (experimentation);
- Filled out an evaluation form created by the project coordinator (evaluation).

Reflection (of the national coordinator and of the participants)

The teachers involved in the project indicated that they really enjoyed working with the stakeholders. Some societal actors indicated that they enjoyed working with the students, saying that they were inspired by them. In particular, one of the SAs approached by the students themselves was happy to get to know these students in a different way than merely as customers in their snack bar. These students also indicated this motivated them more.
The timing of the project was not perfect: there was very little time, both for the teachers involved to organise the project days, and for the students to make 'space in their heads' for this project so close

to the end of the school year. Many students expressed that they preferred 'regular' classes than work on this project. Teachers also mentioned a lack of motivation among some students. They indicated that students are very used to 'passive' classes, where they are given information that they have to reproduce later in a test, which is not the case in a Living Labs project. The teachers felt that these two points were related.

Future Plans

The school was very enthusiastic about the project, and would like to set up another Living Labs project next year. Students were generally, although there were some exceptions, less enthusiastic because they were not used to working in such a way. Teachers also quoted the approaching test week as a distraction: students wanted to focus on studying for their upcoming tests instead of spending time on this project that would not be assessed/graded. For next school year, the school plans to launch a new Living Labs project, with slightly different timing and more student input, which they expect will increase their motivation for the project.

6.1.4. Case study report of the school " Lycée Hénaff ", France

General Information

Country: France

Name of the school: *Lycée Hénaff, Bagnolet (93170)*

Number of teachers who participated in this project and their subject domain: 2, one from the general curriculum and one from the technical apprenticeship track (NB the high school *is both a practice-oriented curriculum (lycée technique) and general one to reach out to university degrees and so on)*

Number of administration staff who participated in the SWOT and their position (e.g. principal): 1, the principal mostly

Number of societal actors and the type of organization (e.g. parents, local producers) who participated in this project: local gardening clubs, youth clubs and also policy makers like *Est Ensemble* and *The town of Bagnolet*

Starting point

Since 2017, this high school has started engaging in sustainable development projects, obtaining the label E3D[9], level 1 (there are 3 levels). Amongst projects: beehives on the rooftop of the lycée, henhouse in construction, collecting organic waste from the canteen for composting and producing biogaz, toilets using rainwater, taking part in the CUBE2020 contest aiming at reducing energy consumption in the school building...
So, the school tackled these issues but not yet in a real living lab manner, still it reached out results and produced tangible objects and services, yet to be sustained and scaled.

Aims

[9] the E3D label is a label that all French schools from junior to high school level can obtain by engaging its students and ecodelegates in projects in favor of reaching out to 2030's SDGs sustaiblable development goals. It's a Franch national policy led by the Ministry of education, youth and sports since 2004, cf https://eduscol.education.fr/1118/qu-est-ce-que-l-education-au-developpement-durable

The project entitled by students "Under the concrete, the vegetables" main focus was to make the school yard where the students take their break, a real engaging place, making it better by the presence of green and living plants and vegetables. Breaking down the concrete to make it a greener place and much more enjoyable and liveable space for students, concrete which is so much associated with current urban landscapes, bringing back nature inside the school! This project wants to demonstrate that nature is not a luxury accessible by only a lucky few, but inside a big metropole like Paris region, can be an experience at hand's reach. A reconnection with nature can be soothing and profitable for everyone, to put your hands in the earth, observe plants grow, wildlife develops, season changes. The idea behind creating also this garden inside the school yard was to allow science teachers (biology and other natural sciences) to use these plants as samples for practical work.
This project aims at creating a Garden Club in the school uniting volunteers, at the same level, whether they are students, teachers or administrative or staff of the school. Gardening means developing or reconnecting with basic knowledge, yet so important, with frugal techniques against chemical intervention and control of nature. It links directly to the food system theme, as students and most people have a distant connection with organic food, as we mostly eat industrialized products, mostly infinitely processed, put under plastic wrapping, with preservatives, coming from a faraway industrial plant. The students could then think about potential urban agriculture capacities in big cities.

Societal actors

Some students from the Energy section of the school, developed a partnership with a societal actor, which is a cooperative of construction of garden tools named L'Atelier Paysan[10]
Students identified a potential partner also in the project, for recycling material, wood etc, which is part of the network of recycling organisations REFER[11] "La recyclerie de la Noue" in Bagnolet.
The project wanted to link up with the network of libraries in Paris and Ile de France region which have developed a netwotk of "seedbanks" [12]for sharing seeds and promote urban agriculture.

Implementation

From the existing Transition Club, the Garden Club was created, engaging the most motivated students, which were meeting once to twice a week to work the garden, plant seeds, taking care of the soil, evaluating the process, observing the transformation in a notebook, taking pictures, publishing it on a blog, meeting other local gardeners, and exchanging around their practices and experiences, share readings etc.
The second step was to engage this project directly in the professional curriculum sections of the high school, engaging students in wood carving (for producing the garden big planters), in biology, in graphic design (to create the visual identity of plant labels and topography of the garden)

Reflection (of the national coordinator and of the participants)

The students involved whether as part of their curriculum or outside of the curriculum were very keen to participate in the project as it was a challenge and that it was a collective endeavor, engaging classes following various teaching paths. The result also was to be shared amongst all the school community and benefitting all potentially as it is now a shared garden and a meeting point, a social space to share knowledge and gardening.
This project was submitted to the Green Hackathon [13]challenge organized by the Region Ile de France and it won a prize! Because of the Covid situation and lockdown procedures at the time it couldn't make

[10] https://latelierpaysan.org/Plans-et-Tutoriels
[11] https://www.reemploi-idf.org/
[12] https://bibliotheques.paris.fr/des-grainotheques-dans-les-bibliotheques.aspx?_lg=fr-FR
[13] https://www.youtube.com/watch?v=zjpbKKJtbn4

its full potential and be managed constantly as the schools had to face several lockdowns with no students neither staff around. This project was very ambitious to bring together students and school teachers from various disciplines, trying to foster a real interest and engagement of the school community in taking care of this garden. It didn't bring together from scratch societal actors, but was developed more as a self-sustainable project inside the school community. The following steps could be to reach out more to external actors and keeping doors open.

Future Plans

The school will continue the same project of pilot phase but will also consider developing new extension of the project, and opening more to external societal actors, but still around this garden, strengthening the existing one, making it a more engaging place for all students and opening it more to the community outside the school. The seed bank which was developed needs to flourish still and make new partners (potential libraries, other gardens in the surroundings, other schools...), many things can be improved and the Garden Club to engage fully the school community, with the student's families.

6.1.5. Case study report of the school " ORT Dafna", Israel

General Information

Country: Israel

Name of the school: ORT Dafna

Number of teachers who participated in this project and their subject domain: 4 - science, English, English, precision agriculture

Number of administration staff who participated in the SWOT and their position (e.g. principal): 1 - deputy principal

Number of societal actors and the type of organization (e.g. parents, local producers) who participated in this project: 6: Scouts, bike club, regional cities association, Ministry of Environmental Protection, Municipality, Academy.

Starting point

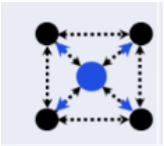
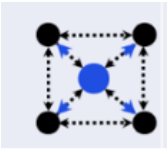
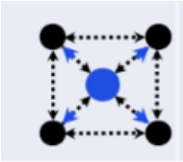
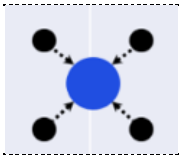
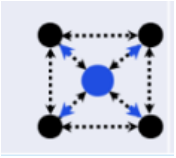
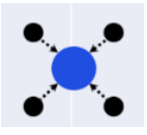
- The school (with some of the participating teachers) took part in the OSOS project for 1 year.
- Some of the teachers were involved in projects with students in subjects relevant to the food system, e.g.: food in space; decreasing the amount of garbage by using alternative edible food packages; molecular gastronomy.

Aims

To decrease the outdoor use of disposable utensils in the general public.

Societal actors

Societal actor	Way of participation	Level of participation

Scouts group of children	The scouts group frequently uses a small park near the school for picnicking during the year (once or twice a week in general). They were considered one of "the users" in the project. A few representatives from that group were involved in the initial brainstorming process to come up with ideas for solutions, along with the students. They also filled in a survey developed by the students. A few representatives from that group participated in a joint "Make-athon" event in school. Finally, the kids of that group also signed a petition for decreasing the use of disposable utensils.	
Etgarim association	A bike club for people with physical disabilities. This group is located near the school, and they are also frequently using the small park near the school for picnicking. The students noticed they regularly use a lot of plastic dishes. Therefore, this group was also considered as "users" is this project. They worked with the students In several occasion along the project, in a similar way to the scouts group.	
Regional cities association	This association has certain responsibilities regarding environmental issues in the region. During the project its representatives were in contact with the school teachers, and they also participated in the Make-athon event with the students.	
Ministry of Environmental Protection	Representatives gave two lectures to the students in relevant issues: the use of plastic tableware and the connection to environmental pollution in general.	
Municipality	The schools worked closely with the Mayor and several departments of the municipality. The Mayer published an article in the local media relating to the problem of extended use of plastic tableware, and wanted to connect with the school for this purpose. He created a campaign throughout the city. He also published in his Facebook channel the survey that was developed by the students, thus highly increasing its reach and impact. Finally, the Mayor publically signed a petition to decrease the use of disposable utensils. Sanitation Department in the Municipality Is intended to help the students during the experimentation phase, by making the arrangements for placing a dishwasher stand in the park, as well as campaign stickers on outdoor furniture. Representative from the Education Department in the Municipality (the head of the Department and his deputy), who are responsible for informal education and youth groups in the city, took part in the Make-athon event in school and collaborated with the students.	
Academy	The school collaborated with a university professor who initiated a project regarding garbage disposal (In general). The students had a lecture on pollution and environmental damages of plastic.	

Implementation

Stage 1: Co-creation

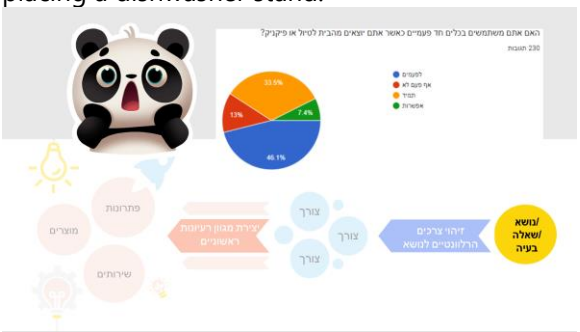
The school initiated a Living Lab workshop for students with the different societal actors. In this workshop they were introduced with the Living Lab methodology. They also took the opportunity to make mutual acquaintance (students and stakeholders). The main part of the workshop was dedicated to collaborative thinking regarding the challenge of extended use of disposable utensils by the general public, towards possible solutions. They worked in mixed groups (teachers, students, and societal actors). At the end of this activity, each group presented its ideas. The students were supposed to then take these Ideas and continue developing them.

Stage 2: Exploration

The students developed a survey for public actors (and the "users" in particular) in order to understand better the problem and its causes. They also used the survey to ask the users to suggest their own solutions, i.e., what would make them change their own behavior and reduce their use of plastic tableware. The students disseminated the survey and collected answers.

In addition, a "Make-athon" event was organized by the school, with the participation of students and several community stakeholders.

The students also started mapping the open area next to the school, in order to find possible spots for placing a dishwasher stand.




Stage 3: Experimentation
The students initiated a campaign throughout the city, with the support of the Mayor. They signed different community stakeholders to a petition for committing to reduce plastic tableware.

Stage 4: Evaluation
N/A

Reflection (of the national coordinator and of the participants)

What worked well during the project?
The collaboration with community stakeholders. The teachers were surprised that a lot of stakeholders agreed to collaborate with them. There was a very good response from the Mayor and the Municipality, as the project subject was highly relevant to the new approach that the city wanted to promote regarding environmental Issues. Also, the Scouts group agreed immediately to participate in the project and contribute In finding possible solutions. This collaboration made the project much better.

What didn't work well during the project?
Due to the Covid19 situation, there were very few people outdoors in public space (during lockdowns, for instance). This damaged the project because the students counted on that for their basic research. They couldn't track and monitor people's behavior in public places. In addition, it was very hard to work for the students in different periods, and the activity was shorter than planned.

What was the value for the participants and what feedback did they give?
The students said that they are now more ashamed to use plastic tableware in their daily lives, and the same for their families in their homes. This is also the case in the teachers' lounge at school - they replaced the disposable utensils (mostly paper and plastic cups) with reusable dishes, in order to raise awareness to this issue. In one school trip they used only reusable dishes - something that never happened before the project. The Scouts representatives told the teachers that they were very connected with the subject, and that they will act as change agents and start encouraging the kids to bring reusable dishes to their outdoors activities. A great value from this project was to the Mayor and

the Municipality, who took this opportunity to leverage the city approach to environment and start promoting it with school students.

6.1.6. Case study report of the school " OŠ "Veljko Dugošević", Serbia

General Information

Country: Serbia

Name of the school: OŠ "Veljko Dugošević", Turija

Number of teachers who participated in this project and their subject domain: 5 (biology, two class teachers, German, mathematics)

Number of administration staff who participated in the SWOT and their position (e.g. principal): headmistress and a math teacher who is acting as her assistant

Number of societal actors and the type of organization (e.g. parents, local producers) who participated in this project: 5 (1 representative from the local eco NGO, two representatives from local government, one representative from the Institute for public health, independent IT expert).

Starting point

This school was involved in many different projects and is familiar with opening to external influences and cooperations. Also, the school is located in a rural, dominantly agricultural area and therefore children and staff are already rather involved in the food production system. There is a school canteen also and children have regular meals at school.

Aims

The main aim of the project was to encourage or inspire more diverse nutrition in the local community. The idea was to implement research about planting habits in the community and to develop a mobile application that combines those data, location of a food producer with the information about climate and makes suggestions about vegetables that are suitable for planting. This was rather relevant for students for several reasons, they created and conducted a survey about planting habits from the research questions to data processing. Students were also talking about their project in the community and practicing their presentation skills. Finally, they followed the process of coding that combined all the data they gathered, all the information about diverse vegetables, with NASA meteorology data in order to make a mobile app helping people to decide which plant they can grow on their very location. In future with the help of this app school team is further developing school garden, powered with compost site they made and quality controlled by representatives of Public health institute.

Societal actors

Three main societal actors were involved in this project, one is representative of the local eco NGO, who unfortunately changed workplace and this cooperation was mainly in the beginning as part of the co-design phase. Representative of the Public health institute was involved entirely at the co-construction level, discussing the project from the beginning and implementing a workshop during the mobile app development. His involvement is planned to last after SALL officially finishes related to the school garden. Two representatives from local government were active on the level of gathering ideas and co-design, but not more than that, it is planned that school team will ask them to get involved more in dissemination activities in future. Independent IT expert is also a former student of this school and his

involvement was completely on the co-governance level, he was there from the beginning and implemented main part of the work, creating the application.

Implementation

First phase involved getting familiar with the SALL project and approach to open schooling. Then three problems were created by the team and main fields of interest were mapped. Based on this three several solutions were suggested by the team and after a while, together with us from Center For the Promotion of Science, a decision about the prototype - mobile application was made. The action plan about each step created a school team and followed in steps.

1. Creating a survey
2. Conducting a survey
3. Data processing
4. Combining survey results with meteorological information
5. Creating a mobile application for planting advices "Moja bašta/My garden"
6. Starting a local school garden based on planting advice made by application

Reflection (of the national coordinator and of the participants)

Living lab methodology is rather hard to implement in communities that have a culture of rather closed communication style. It was most challenging to encourage children to participate in an equal stance as adults. However, the result, this mobile application surpassed everyone's expectation and that is what made the team atmosphere better and satisfaction with the whole process higher. The IT expert who was working with the team became such a positive role model to children and school staff also felt supported by his knowledge and experience.
The team was constantly struggling with innovation and prototype part of their project but once when they came up with the main idea about the mobile app everything fit together and their job was way easier.

Future Plans

The project ended with the plans of first planting in the school garden. Meaning that a lot of work is just ahead for this team, in composting, planting, quality controlling their yield and promoting and using their mobile app.

6.1.7. Case study report of the school " San Felix Ikastola", Spain

General Information

Country: Spain

Name of the school: COLEGIO JESÚS-MARÍA IKASTETXEA

Number of teachers who participated in this project and their subject domain: 2

Number of societal actors and the type of organization (e.g. parents, local producers) who participated in this project: nutritionist, providers and school canteen.

Starting point

Jesús María is a concerted school that still has little experience in international projects but is very willing to embark on processes of pedagogical innovation; Jesús María School also participated in the last phases of the OSOS project and therefore has already had some previous experience in the open schooling methodology. The teacher leading the SALL project in the school is a highly motivated teacher, eager to innovate and to transform the lessons of the pupils. It could be said that Jesús María School does not have much experience in involving local actors in the school's educational projects.

Jesus Maria School was clear from the beginning to approach the project from the point of view of nutrition, to tackle the problem from the composition of food, the caloric weight of food, etc., and also had a clear STEAM approach, creating a solution by putting into practice various instrumental skills such as the digital skill.

Aims

Jesús Maria School has defined the following objectives for its project:

- Assess the amount of sugars taken in the breakfast and brunch and find the consequences in our body of high sugar level a diet
- Discover and elaborate healthy alternatives for their menus.
- Make our community known the results of our research and get them involved into the healthy alternatives elaboration process.

Societal actors

Jesus María School took part in an event organised by the University of Deusto for schools and agents of the food sector. In this initial session Jesus Maria had only defined the general objective of working on the nutritional composition of food, however this open session of sharing ideas with agents helped them to specify the project and to identify collaborating agents for the following phases of the project. The event attended nutritionists, pediatricians, prestigious chefs, sports nutritionists and the Basque food cluster, among others.
Jesús María school began his collaboration with a team of nutritionists at this session. So far, they can be considered involved in the sharing level.
In future phases it is planned to involve a chef and the school canteen in the design of healthy menus. They could be considered involved in the testing level.

Implementation

Jesús María school has designed the project according to the SALL project phases:
CO-CREATION:

- Reflection with students on their eating habits, the nutritional value of food, calories in diets, etc.
- Reflection on misconceptions about food.
- Definition of the project objectives.

EXPLORATION:

- Creative process to propose solutions to the problem from biology and technology.
- Definition of the solution: an investigation to analyse eating habits and the creation of an informative website with the results of the study and useful information for the community on healthy eating.

EXPERIMENTATION: (the school is currently in this phase)

- Design of the online questionnaire to collect information about the food we eat.
- Ask expert nutritionists about specific nutritional questions.
- Registration of the food in a database and calculation of its energy value.
- Design of the website.
- Creation of resources for the website.
- Involve school canteen providers in the project.
- Propose healthy diets to the school canteen.

EVALUATION:

- To assess the data recorded on the nutritional value of the food we consume.
- Evaluate the usability and usefulness of the website with end users such as students from other courses and family members.
- Assess the impact of the solutions created and propose changes and improvements.

Reflection (of the national coordinator and of the participants)

The team of teachers at Jesús María has been very involved in the project since its beginning. They have perfectly understood the methodology of living laboratories, despite their short experience in collaborating with social agents. The teachers' initial interest was in designing a STEAM project and now they are much more focused on designing STEAM projects but with a real impact on their community. They have observed that collaboration with local stakeholders makes students more empowered and motivated, which has a significant impact on their learning.

Future Plans

Jesús María school will finish the project in February with the elaboration of healthy diets. Afterwards, the Jesús María team of teachers plans to start another project using the same methodology to work on aspects related to the ecological footprint and the route taken by the food we eat in our diet.

6.1.8. Case study report of the school " Gaia School ", Estonia

General Information

Country: Estonia

Name of the school: Gaia School

Number of teachers who participated in this project and their subject domain: 3 teachers: 1 crafts teacher (also school event manager), 1 history teacher, 1 science teacher.

Number of administration staff who participated in the SWOT and their position: 2 members - principal and maintenance manager

Number of societal actors and the type of organization: 5 - 2 parents, 1 researcher (expert on food waste), two school cafeteria workers.

Starting point

Gaia School is a private community school founded in 2014, currently situated in Kadriorg, Tallinn. Gaia School is following the national curriculum of Estonia but from the start they have been developing their own approach towards both teaching and curriculum. Gaia school follows the principles of Gaia Education (http://gaia.org/gaia-education) that promotes sustainable lifestyle, caring about the Earth and well-being of the human being. Their curriculum has an emphasis on nature studies and national heritage, it supports integrated lessons and teachers' cooperation. Gaia School is a community school, parents are actively participating in teaching-learning process, especially during project weeks. Gaia School promotes outdoor learning and learning through practical activities - one weekday is a project day for all classes and it is usually spent outside of the school. School has a lot of experience with different projects (local and International) and Project Based Learning as well as Inquiry Based Learning are essential in their curricula.
Gaia School is a community school - this means that the parent's contribution to school life is greater than in an 'average' Estonian school. Parents are welcome (and they eagerly use the opportunity) to participate in their children's' field trips, outdoor activities as well as take part in schools' daily work. School also has the 'Parents' talking circles' where pressing issues are discussed and problems that arise in the classroom level are solved. The school also organizes lectures to parents on topics related to parenting and education.

Aims

The main objective of the Herbarium project was to get to know the traditional herbs growing in Estonia, to learn how to use them (e.g. different fillings and ointments) and also to compile a physical and digital herbarium.
The aim of the Composting project was to reduce food waste in school (and indirectly in student's homes as well) and find a better way to dispose the food waste.

Societal actors

The Gaia School's living lab's core team had a total of three teachers, two members from administration, two parents and two sets of classrooms that worked on the project from the beginning (the problem/idea to the end - the realization of the project). Students and parents worked on the co-construction level and teachers along with the school administrative members worked on co-governance level.
One researcher was also involved in the process of getting to know the food system and food waste theme in more detail (during a lecture). She can be considered as sharing level member.
Also, two workers from the school cafeteria were also involved in the activities (in the Composting project) during the later stages of the project. They can be considered Involved In the testing level, when students started collecting the food waste from the cafeteria.

Implementation

Setting up a Living Lab in Gaia School started with an introduction the overall idea, stages and steps of the SALL project from the NC. The project was introduced via Zoom call, e-mails and call for schools document.
The Living Lab project in Gaia School started with recruiting the classrooms that were the most interested in the project and the theme (food systems) as well. Schools curricula was also considered so that the Living Lab activities could also be connected with schoolwork and there would be no need to find other suitable times. When the Living Lab team was assembled the work with projects started. Before the actual work, questionnaires for students was distributed and SWOT analysis compiled.
The area of the school is surrounded with nature that is considered as a big resource. So, the main goal at the beginning was to find ways how to use the surroundings in schoolwork and how can it be beneficial for others as well. As a result of brainstorming and discussions the Digital Herbarium project was launched. The project had several activities/stages:

1) learning about the herbs that can be found near the school (what do they look like, where they grow)

2) putting together a schedule of summer camp (for collecting the plants)

3) collecting plants and digital material during the camp

4) learning what can be done with the plants

5) experimenting and creating products from the plants

6) sharing the products with others

The aim of the Composting project was to reduce food waste in school (and indirectly in student's homes as well) and find a better way to dispose the food waste. pace. School was a bit reluctant about collecting data from the students since the questionnaires were very long and students had to fill them in twice.
From the point of view of NC, also, the beginning was rocky, because it was hard to motivate schools and explain them how the project can be beneficial and useful for them (since working with community is not a new thing here in Estonia). Luckily school started to grasp the concept and from there on school needed a very little help or guidance.
About the methodology - it is sometimes hard for students and teachers to differentiate the steps (e.g. prototyping) and thy were not very sure if their projects can be fully considered as living lab projects.

Future Plans

The idea is to carry on with the composting project and try it on a larger scale. They have also said that they will start brainstorming problems and exploring new ideas for their Living Lab.

6.1.9. Case study report of the school " Mario Martinolić ", Croatia

General Information

Country: Croatia

Name of the school: Mario Martinolić

Number of teachers who participated in this project and their subject domain: 1 geography teacher, prof. Daniela Kalac Desanti

Number of administration staff who participated in the SWOT and their position (e.g., principal): 1 teacher.

Number of societal actors and the type of organization (e.g., parents, local producers) who participated in this project: 9

Starting point

The school has been cooperating with the Blue World Institute for many years in organizing student education programs by participating in the local community. The school includes local public institutions (museums, the tourist board of the City of Mali Lošinj) and small craftsmen in its educational activities for students to get acquainted with locally relevant issues (biodiversity, nutrition, environmental protection).

The geography teacher who participated in the SALL project is the leader of the School Student Cooperative, which deals with the topic of food production and environmental protection. The teacher with the students within the cooperative produces food products and participates in fairs in which students sell handmade products. Also, the teacher works with students on projects for the protection and preservation of the environment and thus is already familiar with the topic (food production, sustainability in production, food waste, transport, etc.).

Aims

Support schools in partnership with other social actors (primarily small farmers) in solving problems that are relevant to each of them. In this case, it was about introducing students to the processes of placing products on the market, everyday challenges in food production and waste disposal. Also, with this project we wanted to introduce students to the traditional economic activities of food production on the island and to try to give answers to locally important questions on their own, through their own engagement (creativity, critical thinking, cooperation, problem solving). Some of these questions are: How is food produced on the island? What are the challenges in the food production process? How are products marketed and how are they promoted?
One of the goals was to motivate students to consider work and employment opportunities in this sector.
By involving the school and its students in the SALL project, we tried to reduce the roles and boundaries of traditional teaching (although in the school year 2020/2021, traditional teaching did not actually exist because almost all activities were conducted online). Through all these narrowed teaching opportunities, the importance of the SALL project for the whole local community has gained one important dimension, and that is the opportunity for teachers and students to meet each other, but also, opportunity for the local producers to meet with students who have made personal contact and presented their knowledge and experience.

Societal actors

Marko Hirsch - owner of a family farm, olive grower. He participated in a video interview about olive growing and olive oil production.
Franjo Toić - owner of a family farm, member of the NGO 'Pramenka', sheep breeder. He participated in a video interview about sheep breeding on the island of Cres.
Ugo Toić - Head of the Island Development Agency - participated in a video interview on the topic of wool as a waste that is obtained from sheep breeding.
Sonja Jakić - Member of the NGO 'Ruta'. Participated in a video interview on the topic of wool as a waste that is obtained from sheep breeding.
Dario Kučić - Participated in a video interview on the production of sheepskin instruments - bagpipes (linking waste as a resource for instrument production)
Bruno Žic and Željko Žic - Owners of a cheese factory on the island of Cres and owners of the sheep farm
Danijel Rerečić – fisherman, he conducted a workshop with students about tools and methods of caching fish in cres-lošinj archipelago.
Dalibor Cvitković – director of the Turist board of Town of Mali Lošinj, financially supported the trip to the cheese factory for all the students.

Implementation

Co-creation:

- Making contact by phone, national coordinators with the school principal and project presentation.

- The first meeting with the teacher whose class will be involved in the project, the presentation of the SALL project, the collection of ideas for the implementation of the project and the joint identification of social actors from the local community who could participate in the project.
- Contacting social actors from the local community (family farms) by NC.
- Presenting the project to the students and defining the topic in collaboration with the students.

Exploration:

- Some of social actors presented their activities through video interviews. Also, as part of the video interview, students would be given a problem task that they should solve or a problem that they could discuss.
- Motivating students by the teacher for critical thinking, elaboration of ideas (some of it took place online because of the lockdown that was in effect).
- Contacting the Tourist Board of the City of Mali Lošinj by the national coordinators in order to provide financial support for the implementation of the visit to the cheese factory by NC.

Experimentation:

- The experimentation activities were made by some of the students. Some of the students came up with promotional slogans, video commercials and drawings to promote traditional island products.

Evaluation:

- Evaluation of the project activities was made by teacher and NC brainstorming about future activities of the project. E.g: on how to include additional social actors in the project, how to engage students in problem solving, where to represent project activities and project itself. Students evaluated the project at the last project meeting with their teacher.

Reflection (of the national coordinator and of the participants)

Feedback from participants on project activities is very positive. However, we must take into account that the activities took place in unpredictable circumstances and circumstances that were new to the participants as well as to the NC (lockdown due to Covid -19). The activities for the students were prepared in constantly changing circumstances and part of the activities were held online. The students got to know some of the food producers and their methods and ways of food production through pre-recorded video interviews. While in the next year we hope to carry out these activities live, and if that is not possible, do not prepare videos in advance but give students more creativity and freedom to independently explore a given topic within the local community in which schools operate.

For students: The value for the participants is primarily the newly acquired knowledge through a new approach to knowledge - by narrowing the boundaries of traditional teaching, students were actually given the opportunity for experiential learning (e.g. see how cheese is produced from milking to drying cheese). Also, one of the values created through the activities of this project are initiated social contacts with local food producers, but also students with each other - field classes and field trips allowed them to renew friendships and social ties after months of lockdown.

For social actors: Opportunity for social actors (farmers) to present their work to the public (in this case to students). This gives them the opportunity to transfer real experience and problems based on real situations and facts.

Members of the local community gladly accepted the invitation to participate in the project. Those who did not have the opportunity to participate live (already through video interviews) expressed hope that they would be able to do so in the future, and suggested activities (for example: an olive grower suggested that children participate in cleaning or picking olives).

Future

The class that participated in the project this year is the final grade of primary school in the Croatian education system, so it ends its participation in the project. The school's plan for next year is to start the project with a new class (fifth graders) that will participate in the project for the next two years. Also, the

project activities will include students who will participate in the student cooperative of the school, which ensures the voluntary participation of students and the inclusion of students who initially have a strong interest in working on the topic of the food system.
The same teacher who has already expressed a desire to continue the project and cooperate will participate in the implementation of the project, and we hope to expand the number of local actors that are important for this topic. Also, in the hope that measures that limit the implementation of schooling (lockdown) will ease, the plan is for students to visit key places for food production on the islands of Cres and Lošinj, organize a fair of presentation of food products produced by students themselves and students will decide on problem solving topic.

6.1.10. Case study report of the school " Ellinogermaniki Agogi High School ", Greece

General Information

Country: Greece

Name of the school: Ellinogermaniki Agogi High School

Number of teachers who participated in this project and their subject domain: 1 (sociologist teaching Citizenship Education)

Number of societal actors and the type of organization (e.g. parents, local producers) who participated in this project: 3 (parents, a marketing executive from a company, a Red Cross volunteer)

Starting point

Ellinogermaniki Agogi is a school community pioneering in educational innovation, which has played a central role in the European open schooling movement in recent years, as the coordinator of the OSOS project. Over the years of their study in Ellinogermaniki Agogi, the students involved in the SALL pilot have participated in various innovative school projects and activities, in diverse thematic areas. The teacher involved also has a positive attitude towards participating in and organizing innovative educational activities. There is frequent cooperation of the school with external organizations and societal actors, but the concept and methodology of living lab was new to the participants.
The SALL pilot was implemented in the second half of school year 2020-2021. In the first half of the same school year, as well as in the previous school year, the participating students and teacher had worked on the theme of the food system and in particular with food waste and how this can be addressed (as part of activities organized by the BigO and FoodSHIFT 2030).

Aims

For the purposes of the SALL pilot in school year 2020-2021, the high school of Ellinogermaniki Agogi decided to develop a living lab project as part of the Citizenship Education course in the second term of the 1st class of high school (year 10, i.e. 15 to 16-year-old students), building on the previous work of the same students on food waste, but also encouraging them to explore other areas of the food system theme. In order to link the activity with the curriculum, such areas proposed to students included sustainable development, health education, consumer education, and volunteering. All students of the 1st class (5 divisions/classrooms) would work in groups of 4-5 members, each group defining its own specific topic.

Societal actors

During the SALL pilot, the limitations imposed by the COVID-19 pandemic did not allow the school living lab project to develop adequately so that it could involve societal actors to the wished and planned extent. However, many students did consult their parents on the topics they were working on, while some of the student groups managed to get in touch with specific societal actors that provided them with concrete information and ideas to advance their projects. For example:

- A group of students contacted the head of the marketing department of a company to find out how they could promote public awareness about food waste.
- A second team was assisted by IT experts to build a website on which they would regularly upload information and action on food waste.
- A third group consulted with a volunteer from the Red Cross who advised them while they were designing a volunteer action that could take place at the school with the aim of collecting food and other items for people who need them.

The students identified the people they would like to work with, and the teacher helped them to set up the interaction with the societal actors. This interaction took place through videoconferencing, and typically had the form of an informal interview or a structured exchange of ideas between the students and the societal actors.
The level of societal actor's involvement can be described as between "Discovery" and "Generating ideas" ("Communication-Information" to "Consultation").

Implementation

The difficult conditions caused by the COVID-19 pandemic in school year 2020-2021 dramatically limited the possibilities for a full implementation of the living lab methodology in the school, as the vast majority of the lessons and all other meetings and collaborations took place via videoconferencing. However, students' awareness was raised both in relation to the food system theme and the living lab methodology.
The living lab activities were organized into about 10-12 weekly meetings which were held during the Citizenship Education lessons. Almost all of those meetings (with the exception of the last one or two) were realized vial videoconferencing.
Each of the 5 divisions (classrooms) of the 1st class of high school (about 24-25 students in each division) met in plenary at the start and end of each lesson to get instructions and feedback, and spent the rest of the time of each lesson working in groups of 4-5 memebrs.
Teacher instructions required that each group should define its own specific topic, delving into one of predefined areas of the citizenship education curriculum: sustainable development, health education, consumer education, and volunteering.
The living lab methodology was also presented by experts from the Research and Development Department of the school (which is coordinating the SALL project), with whom students discussed their ideas and plans how they could evolve to become living lab projects.
The teacher defined a slides presentation or a scientific article or poster as the minimum final deliverable of each group's work, encouraging students to work gradually up to the step of prototyping, even if the conditions were not ideal because of the pandemic.
In this way, students were involved in creating from scratch action plans to deal with social phenomena such as food waste. As examples of some results, students designed websites informing on food waste, as well designing a voluntary initiative to utilize food leftovers from the school restaurant.

Reflection (of the national coordinator and of the participants)

Due to the COVID-19 pandemic, the pilot living lab school project reached only a preliminary stage. However, planning careful planning based on the living lab methodology was carried out, and students' awareness and interest in the food system theme and the living lab methodology were raised.
Due to the restrictions imposed by Covid-19, many difficulties were faced by the participants in coordinating and implementing the activities at a distance, and intensive collaboration was

disadvantaged by the circumstances. The whole process was often limited to discussions, and the interaction with the community and societal actors could not benefit from activities such as field trips or live presentations or activities observed by the students.
However, the experience for the implementation in the difficult conditions of the lockdown helped the school to carefully plan for a full living lab project in the next school year.

Future Plans

In the following school year, the school is planning to continue with new living lab school projects on the theme of the food system, but also other themes, in connection with the Citizenship Education curriculum as well as the entrepreneurship afternoon club of the 1st class of high school.
In addition, two or three groups of students who participated in the pilot have expressed their interest to continue their actions in the following year. More specifically, students wish to continue their work on the website informing on food waste and the voluntary action for collecting food leftovers at school, with the hope to inspire the younger students to further develop these ideas.

6.2. Questionnaires

6.2.1. Teachers beliefs questionnaire towards SALL approach (pre)

Demographic information:

Name of school:

_____

Subject domain:

_____

Gender: Male ☐ Female ☐ I would rather not say ☐

For the purpose of keeping the questionnaires anonymous and matching your answers before and after your implementations, you will create a personal code following these steps:

1. write the first 2 letters of your mother's name,
2. the first 2 letters of your father's name and
3. 2 numbers for the **day** of your mother's birthday.

Example: *mother's name:* ***MA****RIA, father's name:* ***FI****LIP and the mother was born on the* ***06****th.*
So, the code is MAFI06

Personal code: _____

Directions: Please indicate with an X how strongly you disagree or agree with each statement.

#	Item	1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
1.	I have some experience in school projects that have to do with solving real problems that concern the local community of my school					
2.	I have worked before with societal actors (e.g. city hall, science centers, museums, parents, non-governmental organizations, etc.)					
3.	I am motivated to engage my students in innovative projects					

	instead of more typical teaching experiences					
4.	I have good communication and social skills					
5.	I am skilled at organizing collaborative student work					
6.	I possess all necessary knowledge relating to the SALL methodology					
7.	I possess the content knowledge needed for implementing a school project related to the food system					
8.	Recruiting appropriate societal actors is difficult					
9.	I can make learning engaging and practical for students					
10.	I am open to introducing new methodologies to my teaching practice					
11.	I feel confident to support my students during the SALL project implementations					
12.	I am able to balance the time I devote to the project alongside the demands of the school curriculum					
13.	I have good digital skills (such as creating digital presentations and/or videos, communicating with my students effectively on digital media)					
14.	The school's community has a lot of societal actors who can join the project					
15.	The SALL project stimulates students' independence and problem-solving abilities					
16.	The SALL project will enhance my professional development in regards to project-based learning and open schooling					
17.	I can connect the SALL methodology with other projects in school					
18.	Collaborating with societal actors is very complex					
19.	The school is able to offer resources, funding and/or materials to be used during the project implementations					
20.	Students require a lot of support and guidance to complete the project					

6.2.2. Teachers beliefs questionnaire towards SALL approach (post)

Demographic information:

Name of school:

_____

Subject domain:

_____

Gender: Male ☐ Female ☐ I would rather not say ☐

For the purpose of keeping the questionnaires anonymous and matching your answers before and after your implementations, you will create a personal code following these steps:

1. write the first 2 letters of your mother's name,
2. the first 2 letters of your father's name and
3. 2 numbers for the **day** of your mother's birthday.

Example: *mother's name:* ***MA****RIA, father's name:* ***FI****LIP and the mother was born on the* ***06****th.*
So, the code is MAFI06

Personal code: _____

Directions: Please indicate with an X how strongly you disagree or agree with each statement.

#	Item	1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
1.	My past experience in school projects has supported me in resolving real problems that concern the local community of my school					
2.	I feel more confident in communicating and collaborating with societal actors (e.g. city hall, science centers, museums, parents, non-governmental organizations, etc.)					
3.	I am motivated to engage my students in innovative projects instead of more typical teaching experiences					
4.	I have good communication and social skills					

5.	I am skilled at organizing collaborative student work					
6.	I possess all necessary knowledge relating to the SALL methodology					
7.	I possess the content knowledge needed for implementing a school project related to the food system					
8.	Recruiting appropriate societal actors is difficult					
9.	I found it challenging to support and guide my students during the implementation of the school project					
10.	Students felt motivated to actively participate from the beginning to the end of the project					
11.	The school board supported the school project by providing additional time during school hours					
12.	I was able to balance the time I devote to the project alongside the demands of the school curriculum					
13.	I developed my digital skills through my participation in the project (such as creating digital presentations and/or videos, communicating with my students effectively on digital media)					
14.	The school's community supported the project and cooperated with us					
15.	Throughout the course of the project, all the participants of the Living Lab (e.g., students, teachers, administration staff, external societal actors) worked together effectively					
16.	The SALL project enhanced my professional development in regard to project-based learning and open schooling					
17.	I was able to connect the SALL methodology with other ongoing projects of my school					
18.	It was difficult to convince societal actors to participate					
19.	The school offered useful resources, funding and/or materials which were used during the project implementations					
20.	Students required a lot of support and guidance to complete the project					

6.2.3. Administration staff beliefs questionnaire towards SALL approach (pre)

Demographic information:

Name of school: _____

Gender: Male ☐ Female ☐ I would rather not say ☐

For the purpose of keeping the questionnaires anonymous and matching your answers before and after your implementations, you will create a personal code following these steps:

1. write the first 2 letters of your mother's name,
2. the first 2 letters of your father's name and
3. 2 numbers for the **day** of your mother's birthday.

Example: *mother's name:* ***MA****RIA, father's name:* ***FI****LIP and the mother was born on the* ***06****th.*
So, the code is MAFI06

Personal code: _____

Directions: Please indicate with an X how strongly you disagree or agree with each statement.

#	Item	1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
1.	The school has experience with projects that have to do with solving real problems that concern the local community of my school					
2.	The school has experience with STEAM and environmental related projects					
3.	The school has collaborated with societal actors ((e.g. city hall, science centers, museums, parents, non-governmental organizations, etc.) in the past					
4.	The school highly encourages team work and collaboration among teachers					
5.	Families are highly involved in school projects					

6.	The school has a strong connection with the local community					
7.	The school endorses the importance of working with societal actors					
8.	The school is very motivated in supporting the participation of its staff in innovative projects (i.e. non-traditional methodologies)					
9.	The SALL project aligns with the school curriculum					
10.	The school is able to offer resources, funding and/or materials to be used during the SALL project					
11.	It's difficult to get teachers from different subject disciplines to participate in the project					
12.	The project exposes the school in new and exciting fields					
13.	The project increases the community's involvement in school life					
14.	The SALL project stimulates further professional development of teachers					
15.	The SALL project is cross-curricular, which gives the school a good opportunity to connect to it well					
16.	Collaborating with societal actors is very complex					
17.	Developing a school project in the context of SALL takes a lot of time					
18.	It is easy to ensure adequate involvement of societal actors in the SALL project					
19.	Teachers are hesitant to participate in the SALL project					

6.2.4. Administration staff beliefs questionnaire towards SALL approach (post)

Demographic information:

Name of school: _____

Gender: Male ☐ Female ☐ I would rather not say ☐

For the purpose of keeping the questionnaires anonymous and matching your answers before and after your implementations, you will create a personal code following these steps:

1. write the first 2 letters of your mother's name,
2. the first 2 letters of your father's name and
3. 2 numbers for the **day** of your mother's birthday.

Example: *mother's name:* ***MA****RIA, father's name:* ***FI****LIP and the mother was born on the* ***06****th.*
So, the code is MAFI06

Personal code: _____

Directions: Please indicate with an X how strongly you disagree or agree with each statement.

#	Item	1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
1.	Our previous experience with school projects (e.g., STEAM or eco-related projects) was proven helpful during implementing the SALL project					
2.	The school supported the initiatives of the SALL project (e.g., by providing extra time and/or resources, made specific classrooms available, active participation some members of the administration etc.)					
3.	The school was eager to extent its collaboration network with societal actors (e.g., city hall, science centers, museums, parents, non-governmental organizations, etc.)					
4.	The school highly encourages teamwork and collaboration among teachers					

5.	Families are highly involved in school projects					
6.	The school has strengthened its connection with the local community					
7.	The school staff could devote adequate time for the project alongside the demands of the school curriculum					
8.	The school is very motivated in supporting the participation of its staff in innovative projects (i.e., non-traditional methodologies)					
9.	The SALL project aligns with the school curriculum					
10.	The school offered useful resources, funding and/or materials which were used during the project implementations					
11.	It's difficult to get teachers from different subject disciplines to participate in the project					
12.	The project exposes the school in new and exciting fields					
13.	The project increases the community's involvement in school life					
14.	The SALL project stimulates further professional development of teachers					
15.	The SALL project increased students' self-governance					
16.	Collaborating with societal actors is very complex					
17.	Students did not comprehend the potential impact of the project					
18.	It is easy to ensure adequate involvement of societal actors in the SALL project					
19.	The SALL methodology was easy to understand					

6.2.5. Societal actors' beliefs questionnaire towards SALL approach (pre)

Demographic information:

Type of company/organization (e.g., NGO, marketing company):

_____

Gender: Male ☐ Female ☐ I would rather not say ☐

For the purpose of keeping the questionnaires anonymous and matching your answers before and after your implementations, you will create a personal code following these steps:

1. write the first 2 letters of your mother's name,
2. the first 2 letters of your father's name and
3. 2 numbers for the **day** of your mother's birthday.

Example: *mother's name:* ***MA****RIA, father's name:* ***FI****LIP and the mother was born on the* ***06****th.*
So, the code is MAFI06

Personal code: _____

Directions: Please indicate with an X how strongly you disagree or agree with each statement.

#	Item	1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
1.	I have participated in school projects before					
2.	I am eager to collaborate and support students and schools					
3.	I have a strong network of contacts within my community					
4.	I have good digital skills (such as creating digital presentations and/or videos, communicating with my students effectively on digital media)					
5.	I enjoy working on projects of public interest					
6.	I enjoy working in a team					
7.	I possess the necessary content knowledge relating to the goals of the SALL project					
8.	I am open to new learning experiences					

9.	I am able to balance my time for the project alongside the demands of my work					
10.	I have the skills to manage and operationalize this type of projects					
11.	I completely understand my role in the SALL project					
12.	I lack pedagogical training which I think is needed for participating in the SALL project					
13.	The possible lack of funding might put the success of the project at risk					
14.	The SALL project offers marketing opportunities					
15.	I can connect the SALL methodology with my work					
16.	Participating in the school project provides an opportunity to gain new skills and experience					
17.	I lack teaching experience with students					
18.	I possess relevant content knowledge relating to the food system					

6.2.6. Societal actors' beliefs questionnaire towards SALL approach (post)

Demographic information:

Type of company/organization (e.g., NGO, marketing company):

_____

Gender: Male ☐ Female ☐ I would rather not say ☐

For the purpose of keeping the questionnaires anonymous and matching your answers before and after your implementations, you will create a personal code following these steps:

1. write the first 2 letters of your mother's name,
2. the first 2 letters of your father's name and
3. 2 numbers for the **day** of your mother's birthday.

Example: *mother's name:* ***MA****RIA, father's name:* ***FI****LIP and the mother was born on the* ***06****th.*
So, the code is MAFI06

Personal code: _____

Directions: Please indicate with an X how strongly you disagree or agree with each statement.

#	Item	1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
1.	My previous experience in school projects was proven useful during participating in the SALL project					
2.	During the SALL project, I was eager to collaborate with the school and the students					
3.	I have a strong network of contacts within my community					
4.	I have specific content knowledge and expertise which I was able to use to support the school project					
5.	I enjoy working on projects of public interest					
6.	The opportunity to work with students was very inspiring to me					
7.	The SALL methodology gave me the opportunity to engage in real-world issues that I'm interested in					

8.	It was difficult to manage the school's and students' expectations					
9.	I can balance my time for the project alongside the demands of my work					
10.	The school staff (teachers, administrative staff) were extremely accommodating in terms of scheduling meetings					
11.	I completely understand my role in the SALL project					
12.	I lack pedagogical training which I think is needed for participating in the SALL project					
13.	I had a high level of involvement in the school project					
14.	The SALL project offers marketing opportunities					
15.	I can connect the SALL methodology with my work					
16.	Participating in the school project provides an opportunity to gain new skills and experience					
17.	My participation in the project was hampered by my daily workload					
18.	Students did not fully grasp what their contribution should be during the project					

6.2.7. Students' Attitudes and Civic Engagement Questionnaire (pre and post)

Demographic information:

Name of school: _____

Grade: _____

Gender: Male ☐ Female ☐ I would rather not say ☐

For the purpose of keeping the questionnaires anonymous and matching your answers before and after your implementations, you will create a personal code following these steps:

1. write the first 2 letters of your mother's name,
2. the first 2 letters of your father's name and
3. 2 numbers for the **day** of your mother's birthday.

Example: *mother's name:* ***MA****RIA, father's name:* ***FI****LIP and the mother was born on the* ***06****th.*
So, the code is MAFI06

Personal code: _____

Directions: Please indicate with an X how strongly you disagree or agree with each statement.

#	Item	1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
1	The science I learn at school is relevant to my life					
2	Learning science is interesting					
3	I am confident I will do well on science tests					
4	Learning science makes my life more meaningful					
5	I am a member / I would like to be a member of a science club					
6	I believe I can master science knowledge and skills					
7	I am curious about discoveries in science					
8	I believe I can earn a good grade in science					
9	I would like to do more science activities outside school					
10	I am sure I can understand science					

11	I enjoy learning science					
12	It is exciting to learn about new things happening in science					
13	I am confident I will do well on science labs and projects					
14	I like reading science magazines and books in my free time.					
15	I like watching science programmes on TV, YouTube channels etc.					
16	I feel like I am a part of a community[14].					
17	I pay attention to news events that affect the community.					
18	I like to help other people, even if it is hard work.					
19	I know what I can do to help make the community a better place.					
20	I feel like I can make a difference in the community.					
21	I try to think of ways to help other people.					
22	I should help improve the community					
23	I am an active member of the community					

[14] A community is a group of people with commonalities such as norms, religion, values, customs or identity. Communities may share a sense of place situated in a given geographical area (e.g. a country, village, town, or neighbourhood) or in virtual space through communication platforms (from Wikipedia, retrieved 22 November 2020).

6.2.8. Students Beliefs towards the SALL project Questionnaire (post)

Demographic information:

Name of school: _____

Grade: _____

Gender: Male ☐ Female ☐ I would rather not say ☐

For the purpose of keeping the questionnaires anonymous and matching your answers before and after your implementations, you will create a personal code following these steps:

1. write the first 2 letters of your mother's name,
2. the first 2 letters of your father's name and
3. 2 numbers for the **day** of your mother's birthday.

Example: *mother's name:* ***MA****RIA, father's name:* ***FI****LIP and the mother was born on the* ***06****th.*
So, the code is MAFI06

Personal code: _____

Directions: Please indicate with an X how strongly you disagree or agree with each statement.

#	Item	1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
1	I enjoy taking part in innovative projects					
2	I am excited to pitch my ideas to companies, organizations etc.					
3	I can be an agent of change in my community					
4	I find it easy to identify solutions for community issues					
5	I believe the project relates to my school work and/or my interests					
6	I find it easy to approach societal actors (e.g. city hall, science centers, museums, parents, non-governmental organizations, etc.) when trying to resolve an issue					
7	Communicating with societal actors is easy					

8	I enjoy brainstorming ideas with societal actors					
9	I feel the SALL project gave me freedom of choice					
10	I feel confident that societal actors will take my ideas seriously					
11	The SALL project gave me the opportunity to create an actual product/service					
12	Taking an active role in the project allowed me to feel that my voice was heard					
13	I enjoyed taking part in international online meetings with other SALL students					
14	I persist when trying to find a solution for a community issue, even if that could take a long time					
15	I feel the SALL project provided me the opportunity to propose solutions to a real problem that concerns my community					

SCHOOLS
AS LIVING
LABS

SALL