ESPOO
ESBO

KYKY Living Lab handbook for co-creation by schools and companies

Päivi Sutinen, Director, Open Innovation Platforms in City of Espoo, Six City Strategy
Kristiina Erkkilä, Development Director, Education and Cultural Services, City of Espoo
Piia Wollstén, Project Manager, Open Innovation Platforms in City of Espoo, Six City Strategy
Katja M. Hagman, Project Manager, KYKY, Open Innovation Platforms in City of Espoo, Six City Strategy
Tuija Hirvikoski, Specialist, Laurea University of Applied Sciences
Anne Äyväri, Specialist, Laurea University of Applied Sciences

Published by the City of Espoo
ISBN 978-951-857-736-5

6Aika *Open and smart services*
The cooperation strategy of the six cities

European Union
European Social Fund

Leverage from the EU 2014–2020

LAUREA
UNIVERSITY OF APPLIED SCIENCES
Together we are stronger

Contents

Introduction		3
1. Background and purpose of the manual		4
2. General definition and background of Living Lab		6
3. Principles and rules of the KYKY Living Lab activities		8
3.1.	Definition and main responsibilities of the KYKY Living Lab	9
3.2.	Principles and rules of the KYKY Living Lab	10
4. Actors, roles and responsibilities in the KYKY Living Lab		14
4.1.	Pupils, students, teachers, principals and the rest of the school community	15
4.2.	The role of companies as utilizers of the KYKY Living Lab	16
4.3.	Role of the City of Espoo as an enabler and utilizer	17
4.4.	Research institutes and universities in the role of Living Lab developer	20
5. Co-creation process descriptions		21
5.1.	KYKY Digitori – forum of ideas, needs, contacts and experiences	22
5.2.	School process	23
5.3.	Company process	26
5.4.	Finnish Education Unit's sub-processes	28
APPENDIX 1	Co-creation processes	29
APPENDIX 2	KYKY Living Lab's templates	31
APPENDIX 3	KYKY ESPOO Co-creators	33

Graphic Design by Brandit Advertising Oy

Introduction

KYKY stands for the Finnish words Koulujen (Schools) and Yritysten (Entrepreneurs) Kiihdytetty (Accelerated) Yhteiskehittäminen (Co-creation).

WHY WAS THE KYKY DEVELOPED?

A joint vision emerged few years' ago when Espoo politicians and civil servants appointed opportunities related to the Espoo story and other policies encouraging cross sectoral and cross organizational collaboration for better services and business opportunities. (17.8.2016 at 15.16. http://www.espoo.fi/en-US/City_of_Espoo/Decisionmaking/The_Espoo_Story).

Simultaneously the desire for collaboration, experimentation and value co-creation among teachers, entrepreneurs, local authorities and politicians arouse. The development needs or motives detected in the daily activities of schools were the starting points of co-creation.

The Finnish Education Unit started the test phase relating to the co-creation of digital products and services supporting teaching and personal growth by schools and start-up companies that value user information. KYKY- project (accelerated co-creation with schools and entrepreneurs) was operated by making use of test phase experiences. The Finnish Education Unit organizes, evaluates and develops education in Finnish comprehensive and general upper secondary schools with over 90 schools, ca. 2700 teachers and 27000 pupils and ca. 4600 students.

KYKY- project was a small activity strongly backed up by the Six City Strategy funded by the 2014 The European Regional Development Fund (ERDF), the six cities and the State of Finland. The Six City projects turnover is nearly 80 million euros.The Six City Strategy – Open and Smart Services is a strategy for sustainable urban development carried out by the six largest cities in Finland with the aim of creating new know-how, business and jobs in Finland. The strategy is a part of the implementation of Finland's structural fund programme for sustainable growth and jobs 2014–2020. The primary objective of the Six City Strategy is to strengthen Finland's competitiveness by using the country's six largest cities as innovation development and experimentation environments. The strategy aims to not only produce service innovations, but also to promote competitive business and employment (17.8.2016 at 15.17 http://6aika.fi/in-english/).

The core team initiating and co-creating the KYKY as a public innovation consisted from professionals from the City of Espoo and Laurea UAS. Based on open competition Laurea UAS was elected to compose the actual handbook. Director, PhD. Tuija Hirvikoski and Principal Lecturer D.Sc.(Econ.) Anne Äyväri from Laurea UAS are the authors of this handbook.

Espoo, August 18, 2016
Katja M. Hagman, Project Manager, KYKY, the City of Espoo, Six City Strategy
Piia Wollstén, Project Manager, Open Innovation Platforms in City of Espoo, Six City Strategy

1. Background and purpose of the manual

In the KYKY Living Lab manual for co-creation by schools and companies, the co-creation operating model has been limited to the participation of schools under the City of Espoo's Finnish Education Unit (FEU) and their staff and learners (pupils and students) in development and innovation activities to promote learning and growth together with companies and communities.

The user-oriented design thinking of Espoo's KYKY Living Lab centres around Espoo's learners (pupils and students) and teachers. In the manual, the participation of schools has been limited to the development of individual companies' (or communities') products, services, learning environments, applications and technology promoting learning and growth. This means that the manual does not cover, for example, integrated solutions and systemic innovations involving various parties or test bed activities for EdTech solutions.

The manual has been prepared for the Finnish Education Unit's use as part of the KYKY project, which is part of the Six City Strategy (6Aika project). *The purpose of the manual is to support the Finnish Education Unit in preparing guidelines for the co-creation and in implementing, assessing, developing and spreading the operating model.*

The purpose of the manual is to support the Finnish Education Unit in preparing guidelines for the co-creation and in implementing, assessing, developing and spreading the operating model.

In autumn 2015, the Finnish Education Unit decided to start a test phase relating to the co-creation of digital products and services supporting teaching and growth by schools responsible for basic education and general upper secondary education and startup companies that value user information. This manual has been prepared making use of the experiences so far, the City of Espoo's management system and operating guidelines as well as staff interviews and workshops.

The manual applies the general principles and concepts developed in international Living Lab activities and research as well as other general principles of innovation activities based on co-creation. This way, we would also like to see the approach later extended to cover other activities of the City of Espoo or the Six City Strategy partners. The common concepts also lower the threshold for international co-operation and the international piloting and spreading of the solutions created.

The handbook proceeds from general principles towards descriptions of the KYKY Living Lab actors and the co-creation processes, looking at these from the perspectives of schools, companies and the Finnish Education Unit.

FROM THE FINNISH EDUCATION UNIT'S POINT OF VIEW, THE TARGET BENEFITS OF THE KYKY PROJECT ARE AS FOLLOWS:

- New technology is utilized in the development of learning environments, which supports learning and growth.
- Future development partnerships conform to the principles of sustainable development.
- Espoo's position as a pioneer in the development of learning environments is strengthened. The schools' understanding of the opportunities of co-creation improves, and the interaction with companies and other parties in the promotion of learning increases.

THE OUTPUT OBJECTIVES OF THE KYKY PROJECT ARE:

- An operating model and rules for the co-creation of products and services by schools and companies. (KYKY Living Lab manual for co-creation by schools and companies)
- The schools' understanding of the opportunities of co-creation improves, and the interaction with companies in the promotion of learning increases.

The manual has been limited to the startup stage of the co-creation activities, the Living Lab's early maturity stage. However, Living Lab activities often proceed stage by stage towards a higher degree of maturity. For this reason, the manual has been written such that, once the activities have been established, the KYKY Living Lab can be used later on to promote education exports, for example, or attract international investments and actors to Espoo. However, this also requires the co-creation to produce positive images and concrete benefits at the startup stage. Once the operating model has spread and has been adopted as part of the Finnish Education Unit's and schools' pedagogical activities and the city's general innovation structures and operating culture, the move to the subsequent stages can be made.

THE MANUAL

- describes Espoo's KYKY Living Lab operating model for co-creation as well as the related key concepts, principles, rules and prerequisites, actors and their roles and responsibilities
- describes the co-creation processes and related decision-making points from the perspective of schools, companies and the Finnish Education Unit
- describes the co-creation processes as a flow chart (swim lane) that depicts the roles of all actors at the various stages (Appendix 1)
- lists the templates (including e-forms) used at the various stages of co-creation as well as things that should be taken into account in them (Appendix 2).

2. General definition and background of Living Lab

The birth of the Living Lab operating model is linked with the development of the post-industrial society. The model was initially developed to *understand people's everyday objectives, needs and challenges and solve problems in their actual living and working environment.* The starting points of new products, services and service processes are then the customer and market needs and the production of added value accordingly. The value experienced by the customer is an important criterion in assessing the usefulness of each innovation. The innovations created may be incremental or radical. With the *Triple Helix innovation model* (innovation co-operation between the public sector, universities and companies), innovation policies and funding, innovations may also create new disruptive markets. Such complex development with multiple effects is most evidently taking place at the moment, resulting in new EdTech markets.

With funding from the EU[1] and nation states, Living Lab activities have developed into a widespread approach where international co-operation between end-users, research institutes, cities and companies may also solve complex societal challenges, develop and pilot new business models and policy programs as well as create new jobs.

For example, the quickly progressing effects of digitalization on training and education activities is simultaneously both a challenging change and a global business opportunity that can be reacted to by means of internationally scalable co-operation, also creating jobs based on new learning technologies in Finland. The Living Lab may also be a physical or virtual innovation platform or meeting place, such as an individual school in Espoo or one of the technology platforms or digital applications used by learners, if the purpose is to enable multi-party co-creation and innovation.

The solutions created as a result of the activities may be new or improved products, services and technologies or new, integrated or systemic solutions created using combinations of these. The resulting solutions may also consist of mutually supplementary social innovations, new operating concepts, business models or policy programs, if these are considered to produce added value for end-users. It can be said that, at their best, Living Labs strive for *human-centric added value and innovations that are created by interaction between various actors in the ecosystem and mutually supplementary solutions and result in new markets and jobs.*

The assessment criteria for the concepts and solutions created as a result of development challenges, development proposals, prototypes and activities depend on what new services or other solutions are pursued and how they can be developed in mutual co-operation.

- The Living Lab concept generally refers to a systemic, cyclic innovation, where all co-creation actors take part in the development and piloting of products, services, applications, technologies or new business models and policy programs.
- The parties responsible for product and service development usually take the development work through the following stages: background definition, brainstorming and conceptualization, applying the concept in practice, creating prototypes, testing and further development, business model development and piloting, product launch and subsequent updating and further development.
- The role of end-users varies at different stages of the innovation activities and according to the purpose at each time (the innovation may be developed for, with or by the end-user). The results of the activities should correspond to the needs, goals and values of the customers/citizens/end-users.

[1] *https://ec.europa.eu/digital-single-market/en/news/living-labs-and-open-innovation-20*

The name Living Lab originates from home-like research conditions developed at MIT's Media Lab. From the US, the Living Lab concept spread to Europe as a result of co-operation between Nokia and Finnish universities. Based on the European Commission's recommendation, the Finnish Government proposed in 2006, during the Finnish EU presidency, that a Living Lab network (European Network of Living Labs for pan-European co-creation and experimentation) be constructed to support the European internal market as part of the European innovation, technology and competitiveness policy. Other member states have since contributed to the development of the activities during their EU presidencies. The concept has been widely disseminated in the course of ten years, and it is now being applied for a variety of purposes. Of the administrators of peer-reviewed Living Labs, approximately 3/4 are various educational and research institutes and 1/4 are cities and companies.

Generally, the Living Lab operating methods and environment evolve and change heavily over the years. For this reason, the maturity of Living Lab actors also varies. At the early maturity stage, the activities are test bed-type trials of individual products and services or usability testing. In user-driven Living Lab activities, service design and user-produced development ideas are emphasized more than in test bed activities, in which the user is mainly a passive test object. The user-oriented testbed model provides the company with more extensive control of the development process.

Living Labs that have reached a high level of maturity are usually multi-party and multi-disciplinary organizations. They use a wide variety of methods and innovations (like technology, product, service process, leadership and policy innovations) to produce integrated solutions to complex problems. In them, co-creation and piloting activities usually happen in a number of cities and countries at the same time, simultaneously ensuring the compatibility and scalability of IT solutions and developing new business models.

In recent years, support from the EU and World Bank and co-operation between the Living Lab networks of various cities have contributed to an understanding of how cities can open their development challenges and processes to their partners in accordance with the principles of open innovation activities. At the same time, solutions have been sought regarding the best way to ensure that the voices of both city employees and residents are heard, regardless of which department is responsible for which challenge and solution. The goal of these projects (Human-centric Smart Cities) is not only improving the quality of the services and productivity of the city but also attracting international investments and companies to the city. Solutions created by means of international co-operation are piloted in culturally, juridically and commercially differing conditions, thus accelerating the fast scalability and commercial success of the solutions.

Thanks to the aforementioned merits, the Living Lab concept received the esteemed Innovation Luminary Award in the Open Innovation Infrastructure Creation category in spring 2016. The award winners are selected by a group of specialists consisting of representatives of the European Commission (Open Innovation Strategy and Policy Group [OISPG]) and the industry.

At their best, Living Labs strive for human-centric added value and innovations that are created by interaction between various actors in the ecosystem and mutually supplementary solutions and result in new markets and jobs.

3. Principles and rules of the KYKY Living Lab activities

In this chapter, we describe our proposals for the definitions, principles and rules of Espoo's KYKY Living Lab activities for co-creation by schools and companies as well as the prerequisites for the activities. The strategies and objectives behind the KYKY project have been taken into account in the proposals described in the manual. These include the Espoo Story, the City of Espoo's goals and objectives of the council term, cross-administrative development programs (competitiveness, innovativeness and entrepreneurship), the KuntaKesu plan and the national Six City Strategy.

The handbook emphasizes those Living Lab principles that suit the City of Espoo's values and objectives in order to more easily incorporate the co-creation into the daily activities, structures, common processes, operating models and leadership forums of the city and its schools.

The key KYKY Living Lab principles can thus be summarised as follows:

- Prerequisites for the city's resident- and client-driven operations will be maintained by a supportive and responsible management style while ensuring the smoothness of everyday activities.
- The leading principle is that the co-creation projects of companies and schools are based on a positive, trusting notion of people as well as interaction that values varied expertise and commitment, controlled risk-taking and tolerance of failure.
- The fields of co-operation needed in co-creation are created and strength-ened in various social, professional and virtual encounters between companies, cities, schools and parents/guardians.

3.1. Definition and main responsibilities of the KYKY Living Lab

Espoo's KYKY Living Lab is a co-creation operating model in which the Finnish Education Unit acts as the enabler of co-operation between schools and companies and also as one of the beneficiaries. The development needs or motives detected in the daily activities of schools are adopted as the starting points of co-creation. We propose the following **definition** for the co-creation activities:

The KYKY Living Lab co-creation operating model refers to *the participation of schools under the City of Espoo's Finnish Education Unit and their staff and learners in co-creation and innovation activities for products, services, applications and technologies promoting learning and growth in interaction with companies and communities.*

IN THE KYKY LIVING LAB ACTIVITIES, THE MAIN RESPONSIBILITIES ARE DIVIDED AS FOLLOWS:

1. *Actors in the school community* (pupils, teachers, principals, parents/guardians) recognize the development needs and inform the other KYKY Living Lab actors of these and their own ideas.
2. *Companies* have the main responsibility for their own product development. The role of schools is to act as co-creation partners as part of the school's regular operations and the teacher's work.
3. *The Finnish Education Unit* serves the KYKY Living Lab actors, providing guidance, instructions and environment. The Finnish Education Unit monitors and assesses the co-creation activities as part of the City of Espoo's management system and is responsible for spreading the operating model or running it down, if necessary. The Finnish Education Unit enables the spreading of the results so that they are accessible to all schools. In order to make the activities smoother, operational decision-making on the daily co-creation work is delegated to the principal. The Finnish Education Unit's operating guidelines specify the administrative co-creation duties of the principal.
4. Each party is responsible for its own costs. The technology and equipment used is agreed on a case-specific basis. The parent/guardian will be asked for permission if his/her equipment is going to be used.
5. Preparing an implementation plan for the co-creation project is the responsibility of the teacher (or pair/group of teachers). The principal and company sign an agreement with the implementation plan as an appendix. Before signing the agreement, the actors ensure that all the necessary permits have been applied for/requested or will be applied for/requested before the implementation begins.

The co-creation covered by this manual has been limited to pre-commercial activities only. For this reason, the co-creation projects are not part of Espoo's procurement operations.

THE FIELD OF CO-OPERATION NEEDED BETWEEN THE COMPANIES AND SCHOOLS IS ENABLED AS FOLLOWS:

- *KYKY Platform* for continuous interaction, communication, reporting and monitoring between the schools, companies and Finnish Education Unit. KYKY Platform is a digital platform and/or an e-mail application until Platform is up and running.
- The *KYKY Market* event is organized once per school year. At this event, schools can introduce to companies development needs and ideas arisen out of the curriculum and out of the school's daily activities. Companies, on the other hand, can introduce to schools both their development proposals and their products, services, applications and technologies at various stages of development. Both parties can share their experiences from projects carried out earlier.
- In accordance with the Finnish Education Unit's instructions, companies can, at agreed times, take part in *observation* of the school's operations and in discussions to identify development needs for which they could develop and produce suitable solutions together with the schools.

3.2. Principles and rules of the KYKY Living Lab

This subchapter describes the principles and rules of the KYKY Living Lab that control the daily, practical co-creation activities: the planning, implementation and assessment of the co-creation projects. The principles and rules of the KYKY Living Lab are based on the generally approved Living Lab principles (cf. Chapter 2).

1. THE KYKY LIVING LAB CO-CREATION ACTIVITIES ARE USER-DRIVEN, PARTICIPATORY AND EMPOWERING.

The Living Lab's development and innovation activities are user-driven, not technology-driven. In the KYKY Living Lab, different people and their expertise and ideas meet in the school's daily activities. Co-creation is strongly participatory. It is easy and inspiring for the teachers and learners to take part in the co-creation process. The co-creation experience is empowering. The process is carried out such that it provides everyone with concrete benefits. In the best case, the innovation activities can continuously provide new feelings of success and quick learning through failure. This way, the participants receive continuous feedback that motivates them, accelerates their learning and promotes their individual growth towards their full personal potential.

2. THE SCHOOL AND COMPANY DECIDE TOGETHER ON THE ORGANIZATION OF THE CO-CREATION PROJECT.

In order to keep the participation threshold for the users as low as possible, we propose that the schools and companies have the decision-making power in the organization of the daily co-creation activities. Making co-creation initiatives should be easy for everyone. Initiatives may come from many different sources, including learners, teachers or other employees or companies. The pupils' parents/guardians and recreational organizations may also bring valuable discussion topics to the co-creation process.

The daily KYKY Living Lab activities are organized such that the learners and teachers as end-users may participate in each stage of the product, service or other innovation development process in an appropriate manner. However, the degree of user participation varies according to the stage of the innovation process or the ultimate purpose of the product development (innovations produced for teachers and learners through trials, innovations produced with teachers and learners, and innovations produced by teachers and learners).

3. EVERYONE IS CAPABLE OF INNOVATION.

User-driven innovation activities are based on the idea that everyone, including pupils and students, is able and allowed to innovate. Innovation skills are important for all citizens. This is in line with the new curriculum, which emphasizes the joy of learning and active involvement of the learner. Open innovation activities usually increase motivation, since everyone can contribute to the common output in the daily activities by doing and producing exactly what is created around their own passions whilst seeing the effects of their thinking and actions.

The activities are guided and assessed such that, in the long term, the co-creation leads to the school and learner competences developing first into ad hoc product developers and then towards co-creator and mediator competences in systemic innovation.

The Living Lab activities encourage schools to see trial activities as part of implementing the curriculum and revamping the operating culture. At the same time, the staff and learners are encouraged to innovate and also develop their own activities. Since practice-driven innovation activities (arising from the daily activities of people and the working life) also has great financial significance when compared to conventional science- and technology-driven innovation activities, strong co-creation and innovation competences will influence the career development of future professionals.

In the Living Lab activities, the user is involved at least as a research subject (user-centric). At schools, a situation like this may come about, for example, when a company or other organization observes the daily activities of the school in order to gain new understanding and information about the hidden needs of users. In test bed activities, the teachers and learners may also try out or test products supporting learning and growth or the school may participate in product validation research.

4. ALL THE ACTORS HAVE THE OPPORTUNITY TO PARTICIPATE IN CO-CREATION AND INNOVATION.

In thinking up applications for new innovations, it is customary to utilize active users (or lead or early adopter user groups) who have access to the latest equipment, technical expertise and interest in innovations. However, the KYKY Living Lab does not limit itself to active user schools or individuals. By contrast, all actors are given the opportunity to take part in the co-creation and innovation in accordance with the principle of inclusion. This also benefits companies, since product development units often want to utilize the experiences of various users and information based on actual use in various operating environments. We propose that the Finnish Education Unit monitor the development of co-operation between schools and companies as part of resource planning enterprise resource planning, thus promoting the equal opportunities of learners to take part in the activities and develop their innovation competences.

5. CO-CREATION IS PRACTICAL EVERYDAY WORK.

The innovation activities do not take place in a closed, controlled laboratory but rather in real-life situations, so the development activities at schools are practical and experimental. In the KYKY Living Lab activities, this means that the teachers and learners take part in the innovation activities and/or use the companies' products, services, applications or technologies promoting learning and growth in real applications at school, in practical training, at home or in recreational activities. In this case, the co-creation may also involve secondary or tertiary users from the viewpoint of the learning technology, such as the parents/guardians or employees of third-sector organizations.

In practice, the co-creation concretizes in many different ways as the teachers, pupils and students take part in, for example, various workshops, quick trials and prototyping, or when the daily activities of the target group are studied exploratively and further information is gained by applying ethnographic methods, for instance. Older students, parents/guardians or representatives of the third sector may be recruited as voluntary assistants in the co-creation process.

The starting point of the manual is that co-creation and innovation activities as well as the diverse methods used are part of the schools' pedagogical activities and development work. Accordingly, the activities apply the city's management system and existing operating guidelines. The administrative implementation of the operating guidelines is the responsibility of the school's principal.

6. MULTI-PARTY CO-OPERATION REQUIRES INTERACTION.

Innovation activities are multi-party activities involving the co-operation network relevant to the product or service. This usually involves users and the public and private sector as well as research institutes and the third sector.

In the Living Lab, interaction is intricate and multifaceted. In the interaction, the users, developers, enablers and companies as well as various meeting arenas, tools, environ-ments, distribution channels and feedback mechanisms form an open, dynamic innovation ecosystem. This results in various social, physical and digital fields of interaction promoting learning in which the pupils and students can safely participate in producing the innovations in the school environment. At the same time, they can try how serendipity (lucky coincidences), quick trials and the related failures are part of learning and how learning leads to innovations. However, this requires both the teachers and company representatives to have pedagogical insight and creativity.

Since the KYKY Living Lab primarily concentrates on co-operation between schools and companies, the prerequisites for interaction between the companies, staff and learners are created by the Finnish Education Unit and principals. It is up to the companies to bring in the methods relating to their own product development processes as well as the co-creation tools. The KYKY Living Lab actors and their roles are specified in more detail in Chapter 4.

7. CO-CREATION REQUIRES A SYSTEMATIC APPROACH, COORDINATION AND FLEXIBILITY.

Co-creation requires operating principles and methods that are clear and systematic but also flexible. The clearer the operating principle of the Living Lab and the more detailed the specification of

the development challenge, the easier, more interesting and productive the actual co-creation work at the schools will be. On the other hand, paradoxically, co-creation features surprising elements and requires all the parties to have an open attitude, the ability to change the rhythm of their thinking and an entrepreneurial approach.

Unpredictability is part of all innovation work, meaning that the goals may change during the process or it may become necessary to interrupt the project before it is completed. The feedback received by companies, schools and Finnish Education Unit as well as the participants' ideas may be surprising and unexpected. Matching the working rhythms of schools and companies may also prove challenging. The activities require all the parties to genuinely understand and take into account each other's goals and operating methods and be willing to create new meanings and produce added value for each other together. When the co-operation continues longer, the understanding and trust increase and the work becomes easier.

Multi-party KYKY development work requires both an initiator and a coordinator. The KYKY Living Lab will not start or proceed by itself. What is needed is an actor who assumes the responsibility for coordinating the whole process and its parts. We propose that the Finnish Education Unit make the decision on the co-creation operating model and its assessment and development models. However, the Finnish Education Unit has no control over actors outside the City of Espoo's organization; it is mainly responsible for initiating, coordinating, orchestrating and facilitating the activities and scaling the results and operating model from one school, city or country to another.

The person responsible for the KYKY Living Lab operating model must be well acquainted with the field of teaching, the opportunities of technology and science and the solution to be developed. He/she must also see the benefits sought by all parties. The responsible person must be competent in multi-channel communications and able to interpret the message of one group of actors, like companies, into the language of the other group, such as education professionals.

8. IN ORDER FOR TRUST TO BE BUILT BETWEEN THE ACTORS, THEY MUST BE INTERESTED IN EACH OTHER'S PRACTICES AND GOALS.

The KYKY Living Lab activities require all the parties to be able to understand the daily activities of schools and the learning and growth process of learners as well as the preconditions relating to business. At its best, KYKY co-operation creates new, shared viewpoints or new interpretations of learning and growth opportunities. At the same time, the actors generate added value beneficial to all of them together. They also create future scenarios for digital learning.

As the activities continue and become more established, the maturity of the KYKY Living Lab network increases, and mutual practices and a long-term, trust-based relationship between the various actors becomes a competitive advantage for all the parties. Trust is particularly important if the problem to be solved cannot be specified accurately. Such a situation may occur when, for example, the effects of digitalization on future education are not known well enough and various actors bring surprising tacit knowledge to the innovation process.

Open innovation produces a great deal of valuable information but also requires its user to be able to distinguish between relevant and irrelevant information.

9. THE KYKY LIVING LAB FAVORS THE PRINCIPLE OF OPEN INNOVATION.

The Living Lab activities usually strive to follow the principle of open innovation. Unless otherwise agreed, companies, schools, communities or the City of Espoo utilize external information, competence and experiences in the development of their own products and service processes in KYKY Living Lab projects. For example, open innovation may follow the Creative Commons principles. The city's lawyers may also be consulted in preparing agreements on intellectual property rights (IPR) and copyrights.

Open innovation produces a great deal of valuable information but also requires its user to be able to distinguish between relevant and irrelevant information. Also needed are expertise and the capacity to link external information to the organization's own activities. In KYKY innovation activities, companies, schools and the Finnish Education Unit apply co-creation and co-design

methods, so teachers and learners are involved in the product development as active and equal actors alongside professional designers, researchers and other actors. The members of the school community bring valuable information and experience about the daily activities of the school and learners in addition to providing feedback on the products and services being developed. This way, the Finnish Education Unit and City of Espoo may also utilize their schools' Living Lab activities in the development of their own service offering or service processes.

10. ALL THE PARTIES MAINLY PERFORM THE ACTIVITIES WITHOUT COMPENSATION.

In the KYKY co-creation process, all the parties invest their time in all the phases of the innovation process. Spending time on the co-operation is an investment that should speed up the production of value desired by the customers. Product development corresponding to the values and expectations of users reduces the risks involved in the development of expensive, technical learning solutions, in particular. The time spent on the initial product development may also save marketing costs.

At the startup stage, Living Lab activities are often financed by public funds – project funding from Tekes, the EU or other sources. Since project funding is uncertain by nature, the KYKY Living Lab parties will include the costs of the activities as part of their normal development work. Long-time Living Labs with a high level of maturity have usually productized their activities and standardized their operating processes and sell their services to other actors.

Because they involve lots of hard work, new openings of great societal significance, such as establishing the EdTech field in Europe, are usually financed by public research funds, in which the research institute can also be used to combine the co-creation parties into a consortium and develop new business models and solutions. We recommend this open science, open innovation and open data approach at the latest at the stage where the KYKY Living Lab is intended to generate education and expertise export activities.

Table 1 below summarizes the principles and rules of the KYKY Living Lab.

Table 1. Principles and rules of the KYKY Living Lab

Principles and rules of the KYKY Living Lab	
1.	**The KYKY Living Lab co-creation activities are user-driven, participatory and empowering.**
2.	**The school and company decide together on the organization of the co-creation project.**
3.	**Everyone is capable of innovation.**
4.	**All the actors have the opportunity to participate in co-creation and innovation.**
5.	**Co-creation is practical everyday work.**
6.	**Multi-party co-operation requires interaction.**
7.	**Co-creation requires a systematic approach, coordination and flexibility.**
8.	**In order for trust to be built between the actors, they must be interested in each other's practices and goals.**
9.	**The KYKY Living Lab favors the principle of open innovation.**
10.	**All the parties mainly perform the activities without compensation.**

4. Actors, roles and responsibilities in the KYKY Living Lab

This chapter describes the KYKY Living Lab's actors and their possible roles and respon-sibilities. In individual KYKY Living Lab projects, the roles and responsibilities of the actors vary and are specified in the project implementation plan.

Living Lab actors and their roles are often referred to as *utilizer, end-user, developer and enabler.* These roles may also change in different projects, and one actor may assume several different roles at the same time. In activities led by utilizers, the main focus is on the development of products and services. In activities led by enablers, the main focus is on societal, regional or functional development. In activities led by developers, the main focus is on research and the development of research activities. In activities led by users or user communities, the main focus is on the development of the daily life or activities conforming to the community's own values.

The above concepts are also used in the Six City Strategy process behind the KYKY project. For this reason, we use the same concepts to describe the main actors of the co-creation process and their roles and responsibilities on a general level. In the process descriptions in Chapter 5 and in Appendix 1, the roles and responsibilities of the actors become concrete on a more detailed level.

Figure 1 below depicts the KYKY Living Lab's inner circle and outer circle actors. In KYKY proj-ects, schools and companies are on the inner circle, since they have the key roles in daily activities relating to co-creation. Companies and third-sector actors play significant roles in the development of new services, products and service processes together in close co-operation with the schools' professionals and learners. The companies may either operate in Finland or be interested in starting operations in the country.

The third actor on the inner circle, the Finnish Education Unit, has the role of enabler: it legitimizes and starts the co-creation operating model and provides instructions for, monitors, assesses and develops the model as part of the education unit's development work. Appointed by the Finnish Education Unit, the person responsible for co-creation acts as both a gatekeeper and bridge-builder between the companies and schools. We propose that, in addition to the responsible person, the Finnish Education Unit should also appoint a Mediator Circle that may involve other operators on the outer circle in the development work, as necessary.

The following subchapters provide detailed descriptions of the various actors, their roles and challenges as well as competences that are needed for supporting co-creation and whose development should be supported and assessed at schools.

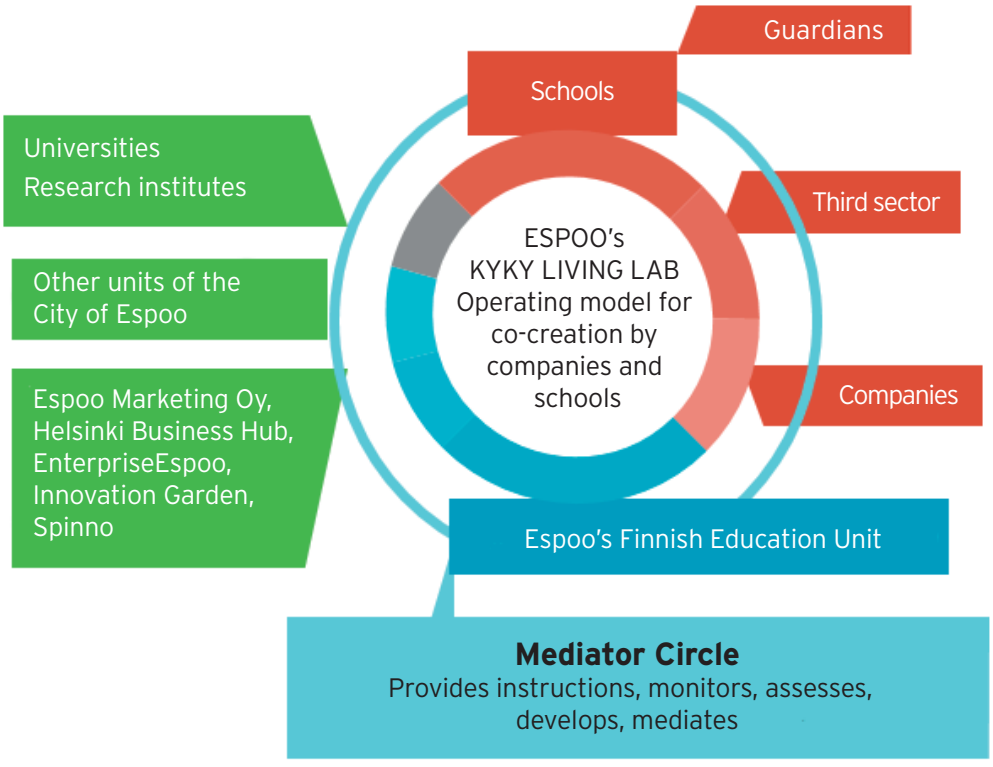


Figure 1. Espoo's KYKY Living Lab actors

4.1. Pupils, students, teachers, principals and the rest of the school community

In the KYKY Living Lab activities, the school staff and learners are specialists in the school's daily activities, teaching, learning and growth, and they are primarily seen as central and equal actors in the co-creation process, as subjects in their own daily lives. In quick trials, piloting and product validation research, the user may also exceptionally be a product development and research object.

The ideas of end-users or the findings and results created with them in the development process may further specify or cause changes in the development project objectives, actors and activities. This requires all the parties to be flexible and able to change perspectives. The requirement of flexibility must be taken into account in the KYKY Living Lab activities' structures, management, decision-making and plans and their implementation.

From the viewpoint of companies, it is important to find the most profitable and efficient co-operation group for each stage of the development activities and suitable end-users from the product development perspective. The companies may indicate wishes regarding the schools and users in a description sent to KYKY Platform. The recruitment of users is agreed upon during the preparation of the implementation plan. In the intermediate or final assessment of the project, the activities can be extended to a new user group by mutual agreement.

As regards different professional groups, it is important to identify the different attitudes of people towards innovations and their implementation *(innovators, early adopters, early majority, late majority and laggards)*. In addition to pioneer groups, co-creation also requires teachers who value stability and continuity in the schoolwork more than the implementation of new innovations *(laggards)*. The further away the co-creation principles and the new product or service to be developed are from the realization of the teacher's values and motives, the more important it is to have clear co-creation rules and processes and a low hierarchy.

Secondary users, such as parents/guardians and recreational instructors, may also be informants important for the product development or actual buyers of the product.

In the KYKY Living Lab activities, the school staff and learners are specialists in the school's daily activities, teaching, learning and growth.

4.2. The role of companies as utilizers of the KYKY Living Lab

KYKY Living Lab activities enabled by the City of Espoo are most likely to attract companies that value user information and the added value produced by the co-creation and trial activities for the company's strategic product development activities and sustainable business.

Companies look at their co-operation with the KYKY Living Lab from the viewpoint of business benefits. The ratio of the investments required by the co-operation to the benefits gained from it decides whether the company will start or continue the co-operation or not. Companies are very rarely able to hand out free samples even for trial purposes.

The equipment, applications and digital meeting places that companies offer to schools to use, as well as the user support and training for such equipment and applications, must always be agreed upon in the project implementation plan. Even though the manual concentrates on co-creation activities without compensation, the time spent on planning and realizing the activities and the information provided by the users may be regarded as a sort of compensation for using the equipment. During the implementation of a new technology, it must be made clear to the end-users that it will only be available for use temporarily.

According to the current legislation and the city's guidelines, a co-creation project must not put the parents/guardians, school or city under pressure to make purchases. Instead, companies may use the *Co-created with the City of Espoo Schools* label as a reference, and the actual commercial activities will take place through the public procurement procedure and other marketing channels.

CO-CREATED WITH THE CITY OF ESPOO SCHOOLS

The co-creation and trial activity schedules may prove challenging for companies, if the school and company activities are not synchronized. In this case, the companies may naturally also start their own, rivalling Living Lab projects, in which they will be responsible for recruiting the teachers and pupils themselves. However, the KYKY label may only be used by products and companies approved for Platform.

The natural beneficiaries from the co-creation and trial activities, whether these are companies or cities, must develop their operating models in addition to making working hour and financial investments, so that user information can be utilized to better correspond to customers' needs, goals and values.

4.3. Role of the City of Espoo as an enabler and utilizer

In the role of *enabler*, the Finnish Education Unit has started the activities of the KYKY Living Lab with the goal of developing schools as an open innovation environment (Living Lab) in order to create future learning solutions in co-operation with companies. In its *enabler* role, the Finnish Education Unit is responsible for managing, assessing and developing the co-creation concept. The daily co-creation activities are the responsibility of the schools and companies as part of their daily work.

The Finnish Education Unit and schools are also the KYKY Living Lab's *utilizers*, who use it develop their own activities, services and service processes. The KYKY Living Lab activities may be used to develop and try out new ways of promoting the realization of the curriculum objectives or provide the learners and their parents/guardians with added value in some other way. This will also realize Espoo's vision of being "a pioneering, responsible and humane city that is a good place to live, learn, work and do business in and where resi-dents can have their say in matters".

With good planning that allows for flexibility, the time invested in co-creation provides more added value and improves the effectiveness of the project. A project making use of communal activities and technology may also allocate resources, for example, to the individual instruction of a pupil.

Learners and their parents/guardians as well as various recreational groups are user communities that might be able to utilize the KYKY Living Lab in, for example, recreational activities supporting learning and growth in the future. In addition, the KYKY Living Lab can be linked with the operations of EnterpriseEspoo and the Innovation Garden, which will give the city the opportunity to productize new corporate services in the field of learning technology in particular.

The more diversely the KYKY Living Lab activities are developed and utilized, the greater will be the added value that it can produce to the City of Espoo and its residents in the future. At the startup stage of the activities, however, the Finnish Education Unit's role has been limited to being the enabler of co-operation between companies and schools and a beneficiary as regards the development of its own activities.

The Finnish Education Unit's duty is to promote and monitor *the equal treatment of the city residents and schools*. For this reason, the city may in some situations have to direct Living Lab projects at selected schools. Naturally, this goal cannot be in conflict with the product development goals.

The work of the schools, their staff and pupils and students in the co-creation and trial activities can be supported by *integrating co-creation into the management and assessment system of the City of Espoo and the schools*. Incentives may be created by, for example, introducing co-creation as one of the background variables in the city's various result, quality and job satisfaction indicators.

Co-creation competence goals and criteria may be developed for schools to guide and motivate them to participate and develop their co-creation competences. A separate process may be created for students through which they can advance from *ad hoc product developers to assistants and specialists in process-form innovation activities*. These actions are used to concretize the Living Lab activities and how the capabilities developed in them are linked to the general objectives of the curriculum. When taking part in co-creation, pupils and students can compile themselves a portfolio that they can use when approaching employers, for example, when applying for practical training or a summer job.

We propose that the Finnish Education Unit appoint one or two persons responsible for the KYKY Living Lab activities. We also propose that the KYKY Mediator Circle be established to support the KYKY Living Lab activities and the persons responsible in particular.

"Espoo is a pioneering, responsible and humane city that is a good place to live, learn, work and do business in and where residents can have their say in matters".

4.3.1. Role and duties of the Finnish Education Unit's responsible person(s)

The person(s) responsible for the Finnish Education Unit's KYKY Living Lab activities (for example, one responsible person each for the Basic Education Unit and General Upper Secondary Education Unit) serve the schools, companies and communities in all matters relating to the KYKY Living Lab activities. They are important advocates for the activities and builders of connections. They guide and encourage the other actors.

The Finnish Education Unit's responsible persons are the first discussion partners towards companies and communities. They check the descriptions of companies accepted for the co-operation and published on Platform and, if necessary, request additional information regarding, for example, the data file, cloud services and observation. The responsible persons ensure that the companies and communities introduced on KYKY Platform are familiar with the KYKY Living Lab's rules and other regulations.

The Finnish Education Unit's responsible persons guide the activities by ensuring that the process descriptions, templates and instructions are up-to-date. If necessary, they utilize the special expertise of the members of the Mediator Circle when, for example, revising the agreement template.

The Finnish Education Unit's responsible persons take care of the production of monitoring and assessment data for the management teams of the unit's lines and that of the entire unit.

4.3.2. KYKY Living Lab's Mediator Circle

Co-creation requires a mediator to enable the development of multi-party co-operation as the volume of the activities and actors increases. Since the mediator is particularly an enabler, it acts as a foundation in Figure 1 (p. 17). In the KYKY Living Lab, the role of mediator is played by the Finnish Education Unit's responsible person and the Mediator Circle of specialists summoned to support him/her. The name Mediator Circle aims to signify the following meanings:

- The Mediator Circle may consist of the core team (for example, the responsible person, representatives of the Finnish Education Unit's five sub-units, representatives of superintendents of schools and pedagogical developer teachers) and a more extensive group of specialists who can change, as necessary.
- The combined expertise of the Mediator Circle covers all the competence areas required in order for the KYKY Living Lab's activities to yield good results. Thus, the Mediator Circle is dynamic by nature, changing and evolving as the activities expand.
- The Mediator Circle builds bridges between representatives of the groups of actors described above. It is a communicator and, if necessary, interpreter that understands the language of education professionals, learners and parents/guardians as well as the city administration and commercial actors.
- The Mediator Circle supports the responsible person and acts together with him/her as a coordinator and reflector of the entire KYKY Living Lab activities and a specialist in assessment and management.
- The Mediator Circle identifies the scalability opportunities of the results and operating model and, if necessary, prepares a proposal for the Finnish Education Unit on these.

It is important that the discussion and interaction relating to co-creation cover at least the Finnish Education Unit's Basic Education Unit, General Upper Secondary Education Unit, Planning and Administrative Services as well as the Educational Technology Services. In addition, representatives of the schools and companies should be heard by the Mediator Circle. This ensures the sharing of information, mutual agreement and commitment and the crystallization

of the division of work, roles, responsibilities and operating models to prepare for growth in the volume of co-creation activities and actors.

It depends on the content of the co-creation activities whether discussions with other city units are necessary regarding interface issues and whether such actors need to participate in the Mediator Circle's activities. For example, sports, culture and leisure services have direct effects on children's and young people's learning in their spare time, so at least the professionals responsible for these may be important partners in the co-creation of new services.

Discussions with procurement specialists and the city's lawyers are part of the develop-ment work and management system. If necessary, the city's specialists provide help and information on earlier and other ongoing co-creation projects (such as the 'School as a service' project) while also developing the common law relating to co-creation in order to ensure the equal treatment of the interest groups. The specialists provide schools with instructions on license agreement issues (with/without compensation) and help determine whether the project deals with, for example, pre-commercial procurement or innovation partnership. They also check other administrative issues required by co-operation with interest groups, such as insurance policies and the preconditions for lending equipment, necessary permissions to hold a secondary occupation and the related notices, taxable values of any prizes awarded to the learners as well as the requirements of consumer protection legislation and personal data file legislation. Instructions may also be needed regarding when the parents'/guardians' consent must be requested for sharing materials or assessing their appropriateness.

We propose that the Mediator Circle be supplemented as necessary – depending on the co-creation project and the needs to strengthen the necessary competence – with representatives of other groups of actors. The planning, implementation and assessment of certain types of projects may require the expertise of, for example, a company offering integration services (here, integration refers to tasks like the integration of electronic services offered by several companies onto one platform, i.e. one user interface, which makes the services easier to utilize, especially for professionals). Correspondingly, a certain project may concentrate on supporting such service concepts supporting learning and growth whose implementation features third-sector organizations in roles larger than schools or the Finnish Education Unit. In this case, it would be necessary to supplement the Mediator Circle with a third-sector representative who has strong experience and expertise in the theme of that particular development project. For example, learning applications serving special groups may belong to this category.

If necessary, the Mediator Circle could be supplemented with specialists from research institutes, universities or other educational institutes. These parties have competences in pedagogy, technology, research and design as well as assessment skills that will be required in evaluating both individual projects and the entire KYKY Living Lab activities.

4.3.3. Other units of the City of Espoo

Espoo City Group Administration, Espoo Innovation Garden, EnterpriseEspoo, Spinno, Espoo Marketing Oy, Helsinki Business Hub Ltd Oy and several other organizations and specialists co-operate with both Finnish and foreign companies. They have the international networks needed for co-creation as well as versatile competence in funding opportunities, user-oriented design and innovative procurements. The Group Administration, on the other hand, helps in the acquisition of supplementary funding (Tekes, EU, etc.) as necessary. Linking these outer circle actors to the co-creation project is naturally only highlighted at the stage when the KYKY Living Lab activities aim for supplementary funding or attract companies and international investment activities to Espoo.

For example, sports, culture and leisure services have direct effects on children's and young people's learning in their spare time.

4.4. Research institutes and universities in the role of Living Lab developer

The expertise of research institutes and universities in the Helsinki Metropolitan Area as well as the staff and students of general upper secondary schools in Espoo can be utilized in co-creation in many ways. For example, researchers in various fields and the Foundation for Finnish Inventions can convey information about what kinds of things have already been tried, what patents have been developed in certain corners of the world or how the results of latest research could be taken into account in trials.

In the genuine multi-party model, research institutes and universities play the role of developer. In a situation like this, the companies or the City of Espoo would receive the user information both directly from the user and from researchers, plumbed, edited and analyzed using methods developed for user-driven research activities. Although the role of developers has been limited in this manual, let it be stated that, thanks to Nordic design and Living Lab activities and training, it is very easy to find actors in Finland with special expertise in the orchestration of developer-driven Living Lab projects, service design, busi-ness model development and scaling as well as research work relating to the subject.

In the genuine multi-party model, research institutes and universities play the role of developer.

In user-driven and externally funded projects, the goal is to combine product development work between product, technology and service companies in order to create new business models, internationally scalable solutions and disruptive new markets. Such development projects usually develop integrated solutions that simultaneously study changes in the school system and the teacher's and learner's work.

5. Co-creation process descriptions

This manual describes the co-creation processes as follows:

- Subchapters 5.2–5.4 provide detailed descriptions of the processes in table format from the perspectives of various groups of actors. The tables show how the process advances stage by stage. In addition, each table indicates the representative of the group of actors who plays the main role at the stage in question as well as the group(s) of actors whose representatives take part in the stage or provide support in the role of consultant or specialist, if necessary. The process descriptions in table format are mainly intended as tools between the Finnish Education Unit's responsible persons and representatives of the Mediator Circle. The idea is that the tables can be easily complemented and changed, either by adding or removing stages and decision-making locations.
- Appendix 1 depicts the co-creation process as a flow chart. The flow chart combines the actor-specific processes described in subchapters 5.2–5.4. It will become a tool for guiding the activities as practical experiences are gained.
- In addition to the above, the client has been provided with a presentation ('Materials for the info package'), in which the progress of the processes has been described by actor type.

We will first introduce our proposal for the content of KYKY Platform. Then we will describe the processes of the school and company as well as the Finnish Education Unit's two sub-processes.

5.1. KYKY Platform – forum of ideas, needs, contacts and experiences

KYKY Platform is an electronic platform that gathers together the elements of the KYKY Living Lab activities. The Finnish Education Unit's responsible persons also take care of the continuous development of KYKY Platform and the up-to-date nature of its contents. KYKY Platform is open to all visitors, meaning that it can be accessed without a username and password. We propose that KYKY Platform consist of the following elements (refer to Figure 2 on this page):

1. IDEAS SECTION

All visitors to KYKY Platform are entitled to store their own ideas in the IDEAS section.

2. DEVELOPMENT NEEDS SECTION

Teachers (and principals) have the right to store information in the Development Needs section. The teacher records a development he/she has identified using a template (for example, an e-form) and stores it on KYKY Platform. A published development need constitutes an invitation for all potential development partners (companies and communities) to express their willingness to start developing a solution to this develop-ment need together with the school.

3. IMPLEMENTATION PLANS SECTION

The teacher and company prepare the co-creation project implementation plan together (using a template, such as an e-form). The teacher stores it on KYKY Platform in order for the information about ongoing projects to be available to everyone.

4. ASSESSMENT SUMMARIES SECTION

The teacher and company discuss the results of the co-creation project. The pupils' development ideas and other feedback have also been collected during the project. The teacher prepares a concise assessment summary (using a template) and stores it on KYKY Platform.

5. COMPANY AND COMMUNITY DESCRIPTIONS

The company, other organization or community sends its description (using an e-form or similar) to the Finnish Education Unit's contact person, who checks it and then stores it on KYKY Platform. The companies update their descriptions, as necessary. The updates also go through the Finnish Education Unit's contact person.

6. OTHER SECTIONS

Naturally, KYKY Platform also provides information on the following:

- Instructions, frequently asked questions, templates, process descriptions
- Contact persons
- Topical issues

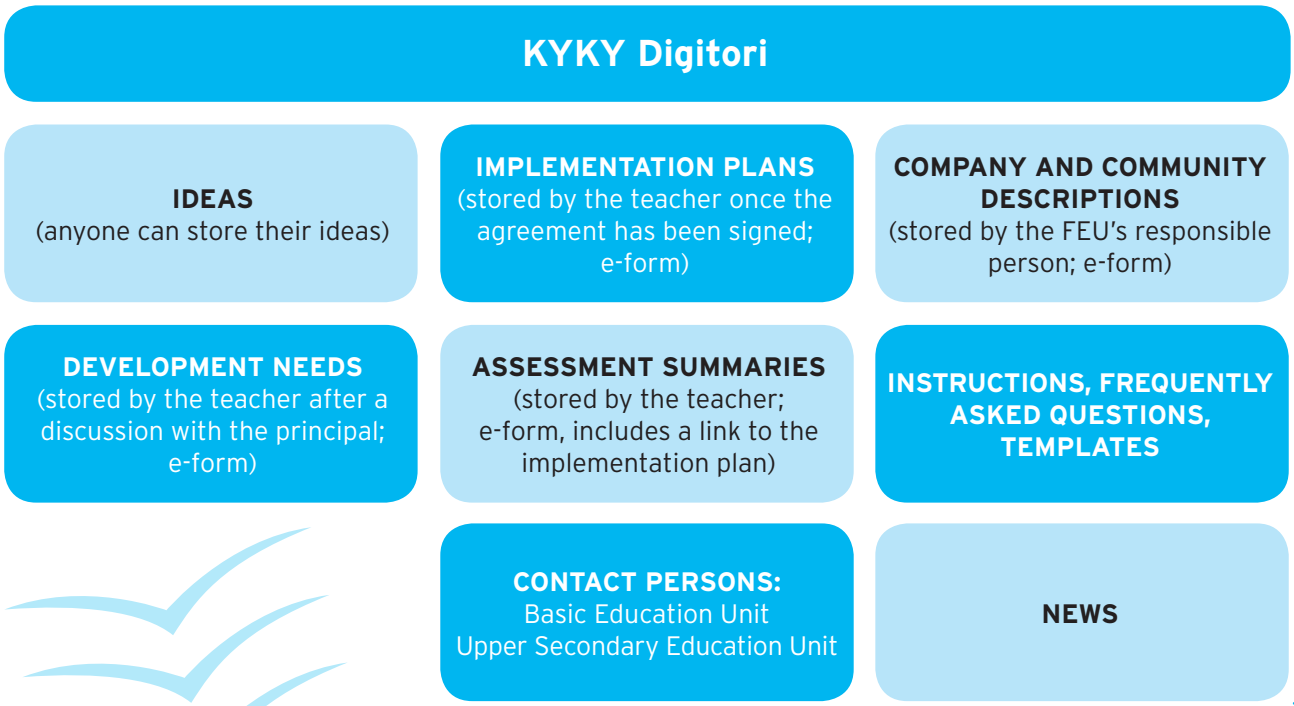


Figure 2. KYKY Digitori elements

5.2. School process

The following abbreviations are used in all process tables:
Tea = teacher
Lea = learner, pupil, student
Pri = principal
Par = parent/guardian
FEURP = the Finnish Education Unit's responsible person
MeCi = representative of the KYKY Living Lab Mediator Circle
Com = company, other organisation, community, i.e. development partner

The stages at which important decisions concerning the process are made are highlighted in **blue** in the process tables. The stages at which the process can be ended are highlighted in **red** in the tables.

The school process is divided into three tables: (1) planning stage, (2) implementation stage and (3) assessment stage.

Table 2. School process: planning stage

Actor responsible	Other actors	What is done?
Tea	Teas, Lea, Par, Pri	The teacher or pair of teachers and the pupil or parent/guardian contemplate what could be done differently. A development need is identified based on the ideas and discussions.
Tea, Pri		The teacher discusses the development need with the principal.
Pri	FEURP	OPTION: After discussing with the teacher, the principal may contact the Finnish Education Unit's responsible person and also discuss the development need with him/her.
Pri	MeCi	OPTION: If necessary, the principal also discusses with a specialist from the Mediator Circle (for example, procurement, permissions or technology)
Pri	Tea	IF the principal agrees with the teacher on the importance of the development need, he/she encourages the teacher to continue the process.
Pri	Tea	IF the principal does not consider the development need presented by the teacher as significant or topical from the school's perspective, the process is not continued. The principal informs the teacher of his/her decision (if it was not made during the first discussion).
Tea		The teacher familiarises him/herself with projects already carried out on KYKY Platform as well as descriptions of companies and communities.
Tea	Pri	IF the teacher does not find a company matching the development need, he/she discusses the matter again with the principal, if necessary, and takes (after the discussion, with the principal's permission) the development need to KYKY Platform using the development need template.
Tea	Com	IF the teacher finds a company or community matching the development need, he/she contacts the company to discuss a co-creation project.
Tea	Com	The teacher and company prepare the co-creation project implementation plan together (template).

Tea	Com	The teacher and company complete the agreement template with the necessary information, if the company has no wishes regarding changes to be made to the template.
Tea Pri		The teacher presents the agreement and implementation plan to the principal. The principal checks the documents. If necessary, he/she consults FEURP, even if the company does not request any changes to the agreement template.
Tea Pri Com FEURP	MeCi	IF the company requests changes to the agreement template, either the teacher or the principal contacts FEURP on behalf of the school. The company may also contact FEURP. If necessary, FEURP requests consulting assistance from a MeCi specialist.
Pri Com		The principal and company sign an agreement with the implementation plan as an appendix. The school stores the scanned agreement in the KYKY archive.
Tea		The teacher sends the implementation plan to KYKY Platform.
Tea		The teacher informs the parents/guardians of the upcoming project (if necessary). If desired, the teacher may utilize the KYKY notification template.
Tea		The teacher ensures that the parents/guardians are asked for any permissions necessary before realizing the implementation plan (for example, permission to use equipment owned by the parent/guardian or permission required by the personal data file legislation, for example, if the application collects pupil-specific user or other information).
Com	Tea	The company ensures that it acquires the permissions necessary, if any, for observation and interviews, for example. The company informs the teacher when the permission has been received.
Com	Tea Lea	OPTION: The company's representative comes to the school to observe the daily activities of the school before the implementation stage begins. The observation (name of the observer, duration) is recorded in the agreement.

Table 3. School process: implementation stage

Actor responsible	Other actors	What is done?
Com	Tea	The company provides orientation to the teacher.
Com	Lea	OPTION: The company also provides orientation to the pupils.
Tea Lea		The project begins. The teacher records his/her own and the pupils' observations, development needs and ideas. The pupils may also record these themselves. The assessment form template may be used for this, if necessary.
Com	Tea Lea	The company helps the teacher (and/or pupils) as necessary during the co-creation project.
Com	Tea Lea	OPTION: The company's representative comes and observes the activities of the teacher and pupils during the co-creation project.
Tea Lea		The project continues until the checkpoint specified in the implementation plan, such as the halfway point.
Tea, Lea	Com	Intermediate assessment
Tea Com		IF the intermediate assessment shows that both the school and the company think the co-creation project is proceeding as planned and the desired effects are reachable, the project continues in accordance with the implementation plan until the final assessment stage.
Tea Com Pri	FEURP	IF the intermediate assessment shows that it is necessary to interrupt the project, this is also discussed with the principal. If necessary, the principal consults FEURP.
Com Pri		IF it is necessary to interrupt the project, the principal and company make the interruption decision according to the criteria specified in the agreement.
Com, Pri		The principal and company sign the interruption decision. The project ends.
Pri	FEURP	IF interrupted: The principal informs FEURP of the interruption and the reasons for it.

Table 4. School process: assessment stage

Actor responsible	Other actors	What is done?
Tea	Lea	At the end of the project, the teacher completes the assessment form (template) on the basis of his/her own and the pupils' experiences and feedback.
Tea Com		The teacher and company discuss the final assessments made by the school and company.
Tea	Pri	The teacher informs the principal of the results of the project, introducing the project's assessment summary and the concise assessment received from the company.
Tea		The teacher sends the assessment summary to KYKY Platform.
Tea	Par	The teacher informs the parents/guardians of the results of the project (if necessary). If desired, the teacher can make use of the KYKY notification template.
Tea	Pri Teas	The experiences and output from the project are handled at a meeting of the school's teachers.

5.3. Company process

This subchapter describes the co-creation process from the perspective of the company or other development partner organization or community. Naturally, many of the stages are the same as for the school process described in the previous subchapter. The first stage, planning, includes a stage highly significant for the company: getting the company's description on KYKY Platform.

Table 5. Company process: planning stage

Actor responsible	Other actors	What is done?
Com	FEURP	The company sends a description of its co-creation ideas to the Finnish Education Unit's responsible person. KYKY Platform has an e-form or similar for the description. The form goes to FEURP. A link to the e-form is also provided on the Espoo website.
FEURP	Com	FEURP checks the description in the form. FEURP contacts the company and, if necessary, requests additional information regarding, for example, the data file, cloud services and observation.
FEURP		FEURP decides whether the company's description is to be published on KYKY Platform.
FEURP	Com	IF FEURP decides to publish the company's description on KYKY Platform, he/she informs the company of the decision. In addition, FEURP informs the company of the rules of co-creation.
FEURP	Com	IF FEURP decides that the company's description cannot be published on KYKY Platform, he/she informs the company of the decision and the reasons for it.
Com	FEURP	The company studies the materials on KYKY Platform. If necessary, it contacts FEURP (for example, copyright issues and the right to use the pupils' photographs).
Tea Com		The teacher contacts the company on the basis of its descrip-tion on KYKY Platform. Alternatively, the company contacts the school on the basis of a development need published by the school.
Com Tea	FEURP	The company and teacher prepare the project implementation plan and agreement using templates. If necessary, the company contacts FEURP, for example, if it wants to make changes to the template or publish the implementation later or if it needs guidance regarding permit procedures.
Com Pri		The company and principal sign the agreement.
Com	Tea	The company ensures that it acquires the permissions necessary, if any, for observation and interviews, for example. The company informs the teacher when the permission has been received.
Com	Tea Lea	OPTION: The company's representative comes to the school to observe the daily activities of the school before the implementation stage begins. The observation (name of the observer, duration) is recorded in the agreement.

Table 6. Company process: implementation stage

Actor responsible	Other actors	What is done?
Com	Tea	The company provides orientation to the teacher.
Com	Lea	OPTION: The company also provides orientation to the pupils.
Com	Tea Lea	The company helps the teacher (and/or pupils) as necessary during the co-creation project.
Com	Tea Lea	OPTION: The company's representative comes and observes the activities of the teacher and pupils during the co-creation project.
Tea Lea	Com	Intermediate assessment at the checkpoint specified in the implementation plan, such as halfway through the project.
Tea Com		IF the intermediate assessment shows that both the school and the company think the co-creation project is proceeding as planned and the desired effects are reachable, the project continues in accordance with the implementation plan until the final assessment stage.
Tea Com Pri	FEURP	IF the intermediate assessment shows that it is necessary to interrupt the project, this is also discussed with the principal. If necessary, the principal consults FEURP.
Com Pri		IF it is necessary to interrupt the project, the principal and company make the interruption decision according to the criteria specified in the agreement.
Com Pri		The principal and company sign the interruption decision. The project ends.

Table 7. Company process: assessment and further development stage

Actor responsible	Other actors	What is done?
Tea Com		The teacher and company discuss the final assessments made by the school and company.
Com	Tea	The company prepares a concise assessment from its own perspective and gives this to the teacher.
Com	FEURP	The company supplements/updates its description on KYKY Platform (e-form). The supplements and updates may include the following: a) assessment of the co-creation project just ended (from the company's perspective) b) new development ideas c) notification if the company is not willing to commit to new co-creation projects for the time being d) notification of new, finished products and services; link to the company website with more detailed information. FEURP stores the updates and supplements on KYKY Platform.
Com		The company continues developing the product or service based on the feedback and development ideas it has received.
Com	FEURP	FEURP invites the company to attend the KYKY Market event, at which the company may present both its development ideas and its finished products and services as well as study both past co-creation projects and the schools' development needs.

5.4. Finnish Education Unit's sub-processes

Below, we present a separate process table from the viewpoint of the Finnish Education Unit's responsible persons, showing how to get the descriptions of companies and communities to KYKY Platform. As the Finnish Education Unit's other sub-process, we present a table relating to the KYKY Living Lab's monitoring, assessment and expansion. However, the latter is different from the other process tables, since a more detailed description would have required in-depth familiarisation with the City of Espoo's management system, which was not possible during the preparation of this manual.

Table 8. Process of the Finnish Education Unit's responsible person: getting the company's description to KYKY Digitori

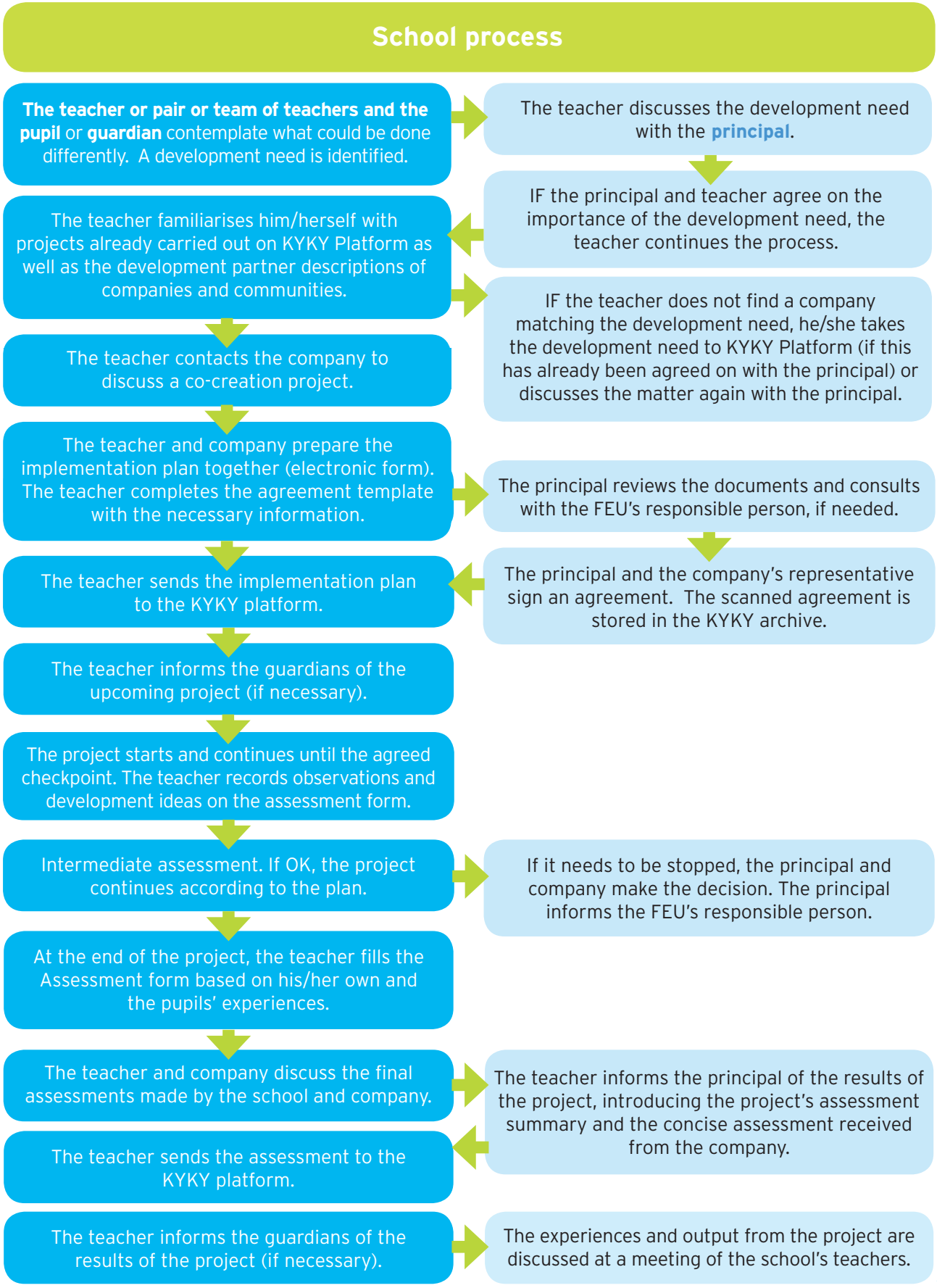
Actor responsible	Other actors	What is done?
Com	FEURP	The company sends a description of its co-creation ideas to the Finnish Education Unit's responsible person. KYKY Platform has an e-form or similar for the description. FEURP receives the form by e-mail. A link to the e-form is also provided on the Espoo website.
FEURP	Com	FEURP checks the description in the form. FEURP contacts the company and, if necessary, requests additional information regarding, for example, the data file, cloud services and observation.
FEURP		FEURP decides whether the company's description is to be published on KYKY Platform.
FEURP	Com	IF FEURP decides to publish the company's description on KYKY Platform, he/she informs the company of the decision. In addition, FEURP informs the company of the rules of co-creation.
FEURP	Com	IF FEURP decides that the company's description cannot be published on KYKY Platform, he/she informs the company of the decision and the reasons for it.
FEURP		Reporting to the Finnish Education Unit's sub-units and the entire unit's management teams at the agreed intervals, detailing the number of the companies and communities on KYKY Platform, etc. The reporting also covers the companies whose descriptions were not published, including the reasons for the decisions.
FEURP		FEURP stores the company's contact information in a client data file or similar so that companies can be sent information about the KYKY Living Lab's changes and KYKY Market events.

Table 9. Finnish Education Unit's sub-process: KYKY Living Lab's monitoring, assessment and expansion

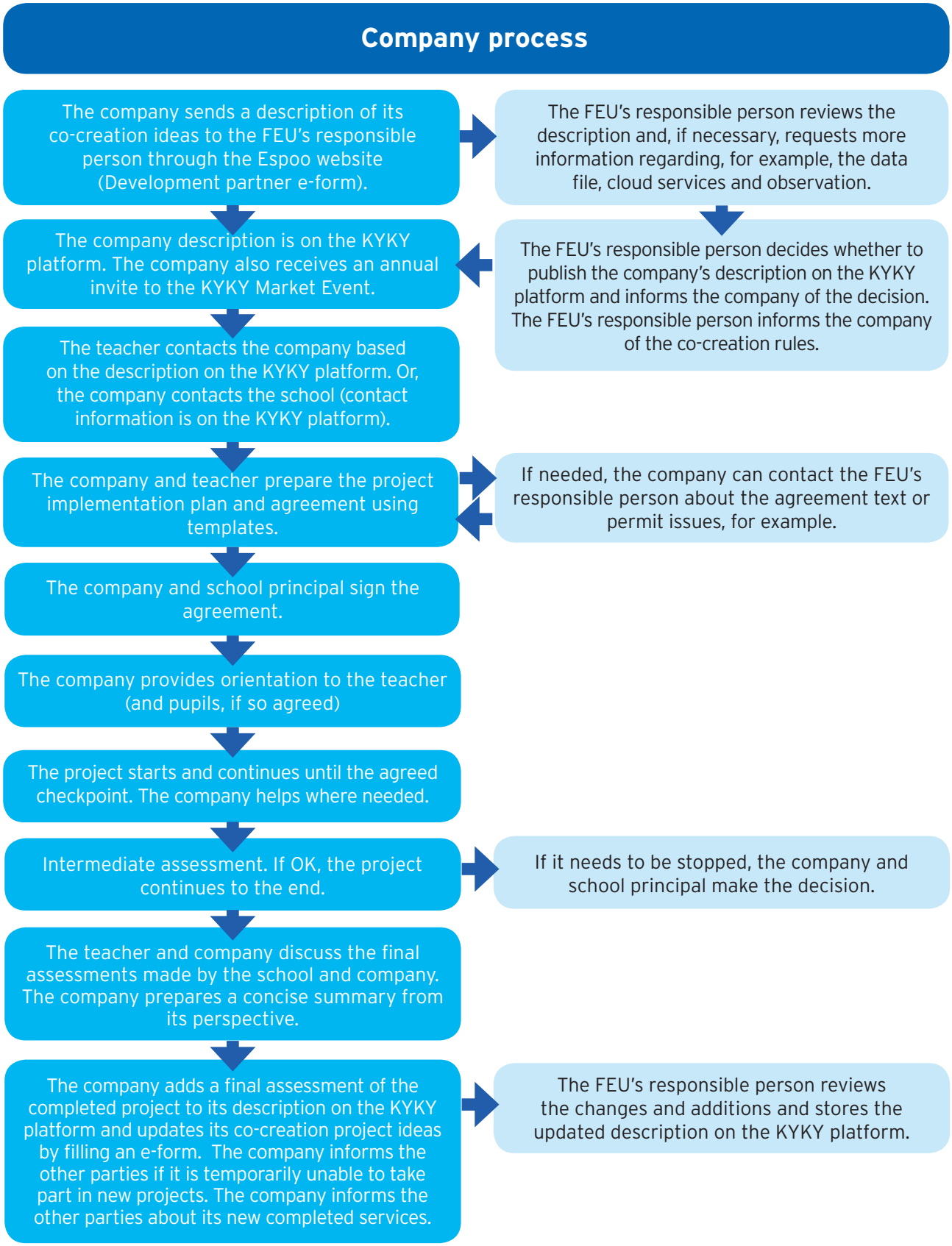
Actor responsible	Other actors	What is done?
FEURP	FEU's mgmt team	Procedure instructions for principals.
FEURP	MeCi	Organisation and further development of KYKY Platform and the KYKY Market event.
FEURP	FEU's mgmt teams	FEURP prepares monthly and annual reports (or reports at agreed intervals) for the Finnish Education Unit's management teams: quantitative indicators (for example, number of KYKY schools, number of projects per school, number of development partners) and qualitative indicators (for example, functionality of KYKY processes).
FEURP	MeCi, FEU's mgmt teams	The activation tasks required by the comprehensiveness of the activities in the direction of both schools and development partners.
FEURP	MeCi, FEU's mgmt teams	Building national (particularly between the 6Aika cities) and international co-operation.

The term 'development partner' used in the table refers to actors outside the City of Espoo's Finnish Education Unit, i.e. companies, other organisations and communities involved in co-creation projects with schools.

APPENDIX 1: Co-creation processes



APPENDIX 1: Co-creation processes



APPENDIX 2: KYKY Living Lab's templates

1. Development need
(published on KYKY Platform, if a suitable partner company cannot be found)

- ★ School
- ★ Teacher(s) (e-mail)
- ★ Grade(s)
- ★ Phenomenon/subject(s)
- ★ The development need in your own words; what should be done differently?
- ★ Desired effects and benefits from the viewpoint of the pupil's learning and growth
- ★ The goal is particularly to strengthen the following sub-areas of comprehensive competence/basic education or general upper secondary education (list with checkboxes)
- ★ The desired effects and benefits from the viewpoint of the teacher's work
- ★ When should the development project begin?

2. Implementation plan
(published on KYKY Digitori)

- ★ The teacher first copies the information recorded in the development need form (listed above, the last item being the desired effects and benefits from the view-point of the teacher's work) and updates or further specifies it, if necessary
- ★ Company
- ★ Company's contact person (telephone and e-mail)
- ★ Description of the service to be developed (according to the information provided by the company)
- ★ Co-creation project resources:
    - Equipment (list with checkboxes; the school's and parent's/guardian's equipment separately)
    - Software (according to the information provided by the company)
    - City of Espoo's cloud services (yes/no)
    - Licences, usernames, passwords (whether these are needed and for whom)
    - Orientation of the teacher(s): number of hours, when
- ★ Dates of the project's initial, intermediate and final assessments; (telephone) discussion between the teacher and company representative on the intermediate and final assessments, date and time
- ★ Will the company representative be visiting for observations/interviews? (yes/no; if yes: when, who)
- ★ Permissions required (list with checkboxes); if needed: who takes care of these
    - Parent's/guardian's permission to use equipment owned by them
    - Parent's/guardian's permission to collect pupil-specific information (by the company/service)
    - Observation and interviewing permission from the parent/guardian
    - Research permission given to the company by Espoo for observations and interviews
    - Cloud service user licence given to the company by Espoo ICT
    - Permission given to the company by the parent/guardian to take photographs during observation, for example, and use them in the company's marketing communications

3. Agreement template

- ★ Some additions must probably be made to the current agreement template:
    - Possible interruption decision to be made after the intermediate assessment: how the decision is made, criteria for the decision, other significant issues; publishing the interruption decision and its reasons on KYKY Platform
    - Principles for publishing the implementation plan (primarily, the imple-mentation plan is published on KYKY Platform immediately after signing the agreement; any deviations must be specified in the agreement)
    - Principles for publishing the final assessment summary (primarily, the final assessment summary is published on KYKY Platform after the end of the process; any deviations must be specified in the agreement)
    - If participants in KYKY Living Lab co-creation processes are given the permission to use the KYKY logo, stamp or similar after the end of the process, this should probably be mentioned in the agreement.
- ★ The permissions required of the company could be appended to the agreement (or a list with checkboxes indicating that the permissions have been checked at the time of signing the agreement in order to ensure that they are intact before the co-creation process is started).

4. KYKY Living Lab notification template for notifications sent to parents/guardians

- The teacher decides how to inform parents/guardians of the co-creation process, if necessary (through Wilma, with a separate notification, etc.).
- The teacher can freely choose whether to use the KYKY Living Lab notification template.

5. Assessment summary
(published on KYKY Platform)

- The assessment form is linked to the implementation plan, which has already been stored on KYKY Platform.
- Very concise basic information about the co-creation process:
  - School
  - Grade(s)
  - Phenomenon/subject(s)
  - Company
  - Short description of the co-creation target (product/service concept)
  - Start and end dates of the co-creation process
- Note: The assessment summary is partly based on feedback collected from the pupils.
- The teacher summarizes the experiences and feedback in the assessment summary, making use of preset questions with a scale, such as:
  - Achieving the desired effects and benefits/ learning and growth goals: (1) the goals were fully/mainly achieved, (2) the goals were partly achieved, (3) the goals were not achieved at all/ almost at all. In addition, a short, informal comment by the teacher (optional).
  - Achieving the desired effects and benefits from the viewpoint of the teacher's work: (1) the goals were fully/mainly achieved, (2) the goals were partly achieved, (3) the goals were not achieved at all/almost at all. In addition, a short, informal comment by the teacher (optional).
  - Achieving the desired effects and benefits from the viewpoint of the company: (1) the goals were fully/mainly achieved, (2) the goals were partly achieved, (3) the goals were not achieved at all/almost at all.
- Achieving goals relating to comprehensive learning (basic education/general upper secondary education): Which competence areas were strengthened during the co-creation process? (list with checkboxes)
- Feedback on the co-creation process – questions with a scale (1 = best, 5 = weakest) on the following, for instance:
  - Smoothness of the co-operation with the company
  - Support, encouragement and instructions received during the planning, implementation and assessment stage of the co-creation process
  - Overall grade for the
- Informal comments and greetings

6. Description of the company or community and updates of the description
(the Finnish Education Unit's responsible person accepts the description and updates for publication on KYKY Platform)

- Company name and contact information, business ID; registration number for associations
- Contact person's name and contact information
- What kinds of co-creation processes is the company interested in? Description including the company's own (service concept) idea as well as basic education and/or general upper secondary education, grade(s), phenomenon/subject(s), etc.
- Company's view of the benefits of co-operation for the teacher and pupils
- What kinds of resources (equipment, Internet connections, teacher's skills) does the co-operation require of schools?
- How long (duration in weeks, for example) does the company think that the co-creation process should be?
- Willingness to make observations either before the start of the co-creation process (planning) or during the process
- Sections to be updated as necessary:
  - In Espoo and elsewhere, what kinds of co-creation processes has the company taken part in?
  - Willingness to participate in a co-creation process in Espoo's schools: when could the next time be, at how many schools, how many pupils at a time? Note: The company also specifies any periods during which it cannot start a new co-creation project.
  - Willingness to participate in a certain co-creation process based on a development need published on KYKY Platform. Note: Clearly specify the development need in which the company is interested.
  - The company's offering of finished products and services. Very short descriptions with links to the company's website

APPENDIX 3: KYKY ESPOO Co-creators

Alaviiri Kaisa	Kjäldman Ismo-Olav	Raja Ilari
Antti Luoto	Kokkonen Hanna	Ramm- Schmidt Erik
Aspiala Tina	Korhonen Antti	Rapo Anne-Marie
Elliot Heli	Korhonen Harri	Rauhala Hannes
Elonen Kiia	Kuismanen Shannon	Rekola Jaakko
Erkkilä Kristiina	Kukkasjärvi Elina	Rinta-Aho Harri
Erma Tapio	Kupiainen Kirsti	Rinta-Säntti Sari
Fransen Jeroen	Kurronen Juhani	Risto-Matti Alanko
Hagelberg Tom	Laakso Outi	Ronimus Joel
Haggren Marianne	Laasasenaho Marja	Rudanko Nina
Hagman Katja	Lauri Risto	Ruotsala Saana
Haukilahti Jarmo	Leino Virpi	Ryhänen Vesa
Heikkilä Leena	Leislahti Vuokko	Ryynänen Miika
Hellsten Mimmu	Leppänen Mikko	Salonen Ilpo
Henriksson Jani	Liimatainen Piia	Sarakorpi Hanna
Hernigle Leena	Lindholm Niko	Siika-Aho Seppo
Hiipakka Olli-Pekka	Lippo Asko	Sinisalo Maija
Hirvikoski Tuija	Lyytikäinen Johanna	Soini Tuukka
Hirvonen Vesa	Meller Hannele	Suomala Anne
Holm Birger	Merja Narvo-Akkola	Sutinen Päivi
Holopainen Katri	Mirja Saro	Taimisto Saija
Huima Ulriika	Myller Eeva	Takko Timo
Hyvärinen-Andersson Anna-Mari	Nurmi Juha	Tikka Kaisa
Hämäläinen Heli	Ojala Marjo	Toivonen Kaisu M.
Hömmö Mikko	Ollila Juha	Tornberg Pirjo
Hörkkö Jouni	Paajanen Henrik	Tuomela Minna
Ikonen Eeva-Kaisa	Pakkanen Liisa	Tuominen Tommi
Juntunen Seija	Paukku Kirsi	Turhanen Helena
Juntunen Simo	Peltola Juha-Pekka	Turunen Samuli
Kaitokari Salla	Pertamo Paulliina	Törmälä Saila
Kangasluoma Anna	Pesola Leena-Kaisa	Uotila Esko
Kauppinen-Hankaa Sari	Pispala Nina	Wollsten Piia
King Mika	Putkonen Sara	Äyväri Anne
Kinnunen Jukka	Raivonen Petra	