



(TagTomat, 2015)

LIFELONG LEARNING THROUGH GREEN URBAN GARDENS



Characters 107.501
Pages 44.7 normal pages

Name and signature

Study no.

Anders Nissen

20154664

Super visor: Michael Søgaard Jørgensen

Abstract

This study investigates how green urban gardens can help the facilitation process of life-long learning in a Danish municipality.

I investigate the current state of Vallensbæk Municipality and their plan for city development. Here, the municipality is focusing on the development of a smart city through the use of technology. Already, they have implemented initiatives like smart trash bins and traffic control. The goal of the municipality is to resource optimize the municipality and to create a higher living standard for the people of the municipality.

By investigating examples I look into the current trends in city development and how a technological smart city may create a higher living standard through the use of Multi-Level perspective.

Furthermore, I investigate how other cities around the world has implemented green urban gardens, and how this ties together with lifelong learning. Moreover, I have created a prototyping space for event driven change, to evaluate how an event driven concept could work in the real world.

Lastly, I propose one path for Vallensbæk municipality, where they through the use of green urban gardens can create a possible learning network between the garden and other local learning institutions. This is expected to provide a visible, easily accessible opportunity for the inhabitants of Vallensbæk municipality to maintain and strengthen the culture of lifelong learning.

Foreword

This report about the integration of lifelong learning into the future city through green urban gardens, I would like to thank first and foremost my Supervisor Michael Søgaard Jørgensen for keeping the project on-route and giving useful input as the project devolved.

I would like to thank The Municipality of Vallensbæk for giving me future resources about their city development plan, and a thank to Marie Gottlieb for taking her time to let me interview her though her otherwise stressed workday. The interview actually set the goal of this project.

I would like to thank Egholmskolen for giving me insights into how schools work, how learning plans are developed and how schools are currently working with new technologies to stay up-to-date on what kids are getting taught.

I would also like to thank those who participants who participated in the prototype.

I would lastly like to thank my friends and family who has not only supported me, but also discussed the different aspects of this project in depth.

1. Introduction	8
1.1 Limitations / problem definition	10
2. Focus area	12
2.1 Introduction to the municipality	12
3. Theory	14
3.1 Multi Level Perspective	14
3.1.1 The socio-technical Landscape	16
3.1.2 Regime	16
3.1.3 Niche	16
3.2 Lifelong learning theory	18
3.3 Wicked Problems	19
4. Methods	20
4.1 Double diamond	20
4.2 Desk research	21
4.3 Prototyping space	22
4.3.1 Boundary object	22
4.4 Semi-structured Interviews	24
4.5 Survey	24
5. Methodology	26
6. Empirical research and analysis	28
6.1 Future scenarios of cities	29
6.1.1 Automatization and technology-driven cities .	29
6.1.2 Lifelong Learning	30
6.1.3 Urban gardening	31
6.2 Research summary	32
6.3 Case studies	36
6.3.1 Detroit	36
6.3.2 A guerrilla gardener in South Central LA Ron Finley	38
6.3.3 Local gardens in Denmark	40
6.4 Case study - Summary	41

7. Solution space	42
7.1 Feasibility survey	42
7.2 Three Possible ways of implementation	43
7.2.1 Through already established institutions	43
7.2.1.1 Interview with the Department manager	44
7.2.2 Through local events (IDA, LYNGBY)	45
7.2.2.1 Interview with Kurt	46
7.2.3 Guerrilla Method	47
7.3 Three Possible ways of implementation Summary	48
7.4 Prototyping space	50
7.5 Prototyping space - cancelled	52
7.6 Proposed integration	54
7.6.1 School integration	55
7.7 Integration continued	56
8. Discussion	58
9. Conclusion	60
10. Reflection	61
11. References	62
11.1 Literature	62
11.2 Illustrations	67

1. Introduction

When looking at Denmark from the outside world, Denmark is currently one of the highest educated countries. Denmark is ranking number 3 in the best higher education systems, (manager, 2016) and is also one of the countries that invests the greatest amount of money compared to Gross Domestic Product (GDP) back into education and educational programs. (Education at a glance 2014, 2014)

This is a result of a tradition in Denmark, where education is culturally highly ranked (UVM, 2007). Education is not only a part of the public schools, the high schools, and the universities, but is also a part of the everyday adult life. Up to 60% of the Danish labor force has participated in a learning activity with an aim to include even more, thus increasing the participation in the lifelong learning culture of Denmark. (Jan Reitz Jørgensen and Danmark. Undervisningsministeriet. Afdelingen For Erhvervsrettet Voksenuddannelse, 2007)

One way of increasing the number of people participating in the lifelong learning culture is to create better learning environments for the citizens. In this regard new initiatives can motivate people to learn new and interesting skills or simply some of the basic skills of life. The city can facilitate a place to improve or increase your existing skillset, or simply let the local masters of one or more skills teach other people in the community their skills, and thereby increase the knowledge in the city. This is what I will describe as a learning culture.

The municipality of Vallensbæk is one of the municipalities in Denmark who put the most money into education per capita and is thereby a prime candidate to become a smart learning city. (Kend din kommune – Brug nøgletal i styringen 2019, 2019)

In Vallensbæk they are however currently mostly focusing on the smart aspect of the city development where the Internet Of Things(IoT) can gather city information, such as garbage levels in containers, a smart traffic light that adapts to the number of cars coming from each direction during the day, motion-activated streetlights e.g.

But what if the city itself became the learning ground for everyday people? Could a local initiative such as urban gardening create a common ground for education and learning basic or even advanced skills? What can urban gardening contribute with in relation to a city of learning, and thereby the learning culture of Denmark.

Research Question

How can a Danish municipality promote and maintain the Danish culture of lifelong learning through the development of urban gardening in the future city

1.1 Limitations / problem definition

To answer this question, I firstly need to explore the topics of Lifelong learning, future development of cities, and community-based learning initiatives. I need to have an understanding of why Lifelong learning needs to be thought of when creating our future cities. I will need to focus on communities of practices since I can develop social groups with learning in focus.

I have chosen to narrow down the project to be limited to learning cities in respect to urban farming. This is done due to the topic of lifelong learning cities spanning across all the aspects throughout our life, from kids to adults, from private to industrial applications. (Dirks, Gurdgiev and Keeling, 2010). Furthermore, lifelong learning can be implemented in many different ways, thus why I will only focus on this specific way of implementation.

In this project, I will examine what urban farming can do for a municipality. To this extend I explore who should be involved, what should be facilitated, and what the possible aims of implementing this.

During this project, the pandemic of Covid-19 did, however, hinder the projects social workshops and many of the indented interactions, since all the public institutions in Denmark, that being both the municipality and school in which this project collaborated with, were either closed or did not have the available time for this project of future development since the pandemic needed immediate action. Therefore, instead of workshops in the municipality i look into different cases from around the world, as well I conduct surveys and phone interviews with the people who participated in the project.

I have furthermore created a small learning event-based on exploring one of the aspect of growing food at home, which I used as a boundary object to investigate how learning events could be formed.

2. Focus area

2.1 Introduction to the municipality

The area this thesis will focus on, is the Municipality of Vallensbæk(Figure 1), a suburb just south of the Capital of Denmark, Copenhagen. The municipality has around 16.000 citizens and are one of the smallest in Denmark. (www.statistikbanken.dk, n.d.)

The municipality is considered one of the wealthier municipalities in Denmark, but uses significantly less money on social aspects like Elderly Care & Handicapped as well as Environmental Protection and the Culture sector, where they are amongst the lowest ranking in Denmark. However, one sector Vallensbæk Municipality is at the forefront is Education.

Here the municipality is among those who uses the largest amount of money compared to the rest of The municipalities in Denmark. (www.kenddinkommune.dk, 2017)

When looking at the politics in the municipality, it is a very split up municipality where the biggest social and liberal parties are very close. This has caused a shift of political power for the last three elections and currently the social democrats are running the administration.

(kmdvalg.dk, 2019)

The municipality does not have a great amount of local companies and are characterized by people commuting to other municipalities for work. Vallensbæk is however working with local investors to make the local industry more viable as well as establishing a relationship between the local companies and educational facilities to create a better education for the future generation. (Vallensbæk Kommune, 2019)

The focus of education and local companies makes this municipality great for this study. This is further supported by the public school reform of 2014, stating that there should be a stronger cohesion between the public school and local companies with the common goals of school subjects in mind(www.uvm.dk, 2020)



Figure 1 In this satellite photo we can see the municipally investigated in this report. In the south we will see Vallensbæk Habor, and in the north we will see a big residential area (Vallensbæk Kommune, 2017)

3. Theory

In this chapter I am investigating the main theory used for this project, that being Multi-Level-Perspective (MLP). I have chosen to use MLP due to its ability to describe the world in a continuous way, where the regime we live in will experience incremental changes over time. Since I in this project will investigate how, lifelong learning can be integrated into a Danish municipality, I am thereby able to investigate lifelong learning as a niche innovation, and how this can be adopted into the regime in the future. To this extend I subsequently present relevant theory about lifelong learning and wicked problems, through which I intend to enlighten the main research question (as presented in chapter).

3.1 Multi Level Perspective

Multi Level Perspective is an analysis method created by Frank Geels, professor at University of Manchester, who specializes in the development of socio-technical transitions. This method describes the socio-technical systems we are currently in. In this theory, socio-technical changes are not seen as a single or final change, but as an interaction between three socio-technical levels, the socio-technical landscape, the socio-technical regime and niche innovations. The interactions will happen stepwise over time in a dynamic progress. (Figure 2)(Geels, 2005)

In Multi level perspective four pathways are seen: transformation, reconfiguration, technological substitution, and de-alignment & re-alignment. These pathways are different in regards of timing, nature and multi level interactions. Furthermore, the Reproduction process has to be taken into account by describing the stable network with no pressure and thereby no change. This is best described by Geels

“Reproduction process: If there is no external landscape pressure (‘regular change’ in Suarez and Oliva’s typology), then the regime remains dynamically stable and will reproduce itself.”
(Geels and Schot, 2007 p.406)

This describes the process of the regime keeping stable and thereby unchanging.

The four pathways describe how a niche innovation can become a part of the system, and how the niche will change the system it is integrated into. This will be a result of how big and how sudden a landscape change is. As an example of this, the change from oil to renewable energy is a slow change, contrary to the process of changing physical school to online school during COVID-19 which happened within a week.

- The **transformation** path describes a small to moderate landscape pressure, and in this state, the amount of pressure on the landscape will not be enough for radical change and will therefore not support niches of those. Instead, the niches will create a disruptive change and modify the development paths of the regime and the niche itself. This can be seen as when the electric car entered the mobility regime, where the path has been altered from mainly petrol-powered cars to seeing electric also being a common occurrence in our daily life’s. (Geels and Schot, 2007)

- **De-alignment & Re-alignment** path revolve around a sudden change in the landscape. Here actors may lose faith in the regime. Consequently niche innovations are often adopted or developed to cope with this regime problem, One specific niche will often become dominant and create a re-alignment of the regime where the niche is adopted. (Geels and Schot, 2007)An example of this can be the DDT ban in 1970(DDT being a type of pesticide), where the public questioned the way we grow crops, and the niche of growing your own food thrived. (US EPA, 2018)

- **Technological substitution** is when a landscape change is sudden, big, and very disruptive of the current regime. This can be exemplified in the current Covid-19 pandemic, where the way we teach, socialize, grocery shop and much more from one day to another changed into an online exercise, rather than a physical one. (Geels and Schot, 2007)

- **Reconfiguration** pathways are symbiotic innovations where already developed niches are adopted into the regime to solve local issues. The adaptation of niches that are new to the area, will create additional adjustments in the regime. This will be the main focus of this study, since we in this project through the use of another well-established niche will create a relationship with the current line of adaptation, and thereby gain a greater chance of successful implementation in the regime. (Geels and Schot, 2007)

In this study I have used the four pathways of MLP to describe the current socio-technical transition happening within Vallensbæk Municipality to understand what transition is currently going on, and find the path that suits my own agenda the best.

I candeduce from Geels descriptions, that when a niche innovation is adopted into the current regime, it is often due to a pressure change from the landscape where the current regime simply is not compatible in its current state to the demand made by the landscape. Here the regime will find an alignment between itself, the landscape and a niche innovation that is solving the current demand and adopt it as a part of the regime where the niche becomes a common state in our lives.

3.1.1 The socio-technical Landscape

The socio-technical landscape describes the macro level of society, with the fundamental cultural norms, the greater economics, as well as events that can make societal changes. Those events are called "windows of opportunity" according to Geels.

These "windows of opportunity" allows niche innovations to be adopted into the socio-technical regime. Some of the landscape changes that are currently happening are climate change, where the historical focus of production has changed into a more climate centric one. This creates an opening where the niche and regime can align in order to become more climate change oriented, whereby a new norm for the regime are created, fulfilling the need of the pressure made by the change in the sociotechnical landscape.

3.1.2 Regime

The regime is the Meso level of society - our current everyday life. Here, we find the locked-in networks of different actors entangled and self-reinforcing the network (Geels and Schot, 2007). This will be the actors, the market, scientists, technologies etc. Changes in the regime can happen by a change in the landscape, where niches will be adopted, and the regime once again will be re-aligned and create a new, now stable regime. One of the stable networks we see in our everyday life would be the current car regime, since technology, politics, practices, and many other actors are all working to keep this regime up and running.

3.1.3 Niche

Niche Innovations are the Micro level in MLP. The niche innovations are new and unstable and are therefore trying to become a part of the norm.

Niche innovations can be seen as smaller decoupled networks, working alongside the current socio-technical regime. The Niche innovations are trying a new trajectory of how and why to do things in a different manner than what is currently the norm, also known as the regime. The niches will thereby be waiting for landscape change, also called a "window of opportunity" for a chance to get adopted into the regime.

One example for this would be electric cars due to the current change in the sociotechnical landscape towards being more environmental-friendly. However, the electric car has failed to become a part of the regime many years before, when the EV1 (the first mass produced electric vehicle) in the 90' failed since the network around it was not convenient and oil prices were low.

In this project I have chosen to use MLP rather than the commonly used Actor-Network theory (ANT), since ANT describes a socio-technical network transition by mapping both human and non-human actors as equal. In ANT, new stable networks are created through the four moments of translation; Problematization, interessement, enrolment and mobilization (Callon, 1984). While this theory can describe the transition I am creating, it will lack the Macro overview, where different niches are reliant on each other for the transition to take place.

Increased structuration of activities in local practises

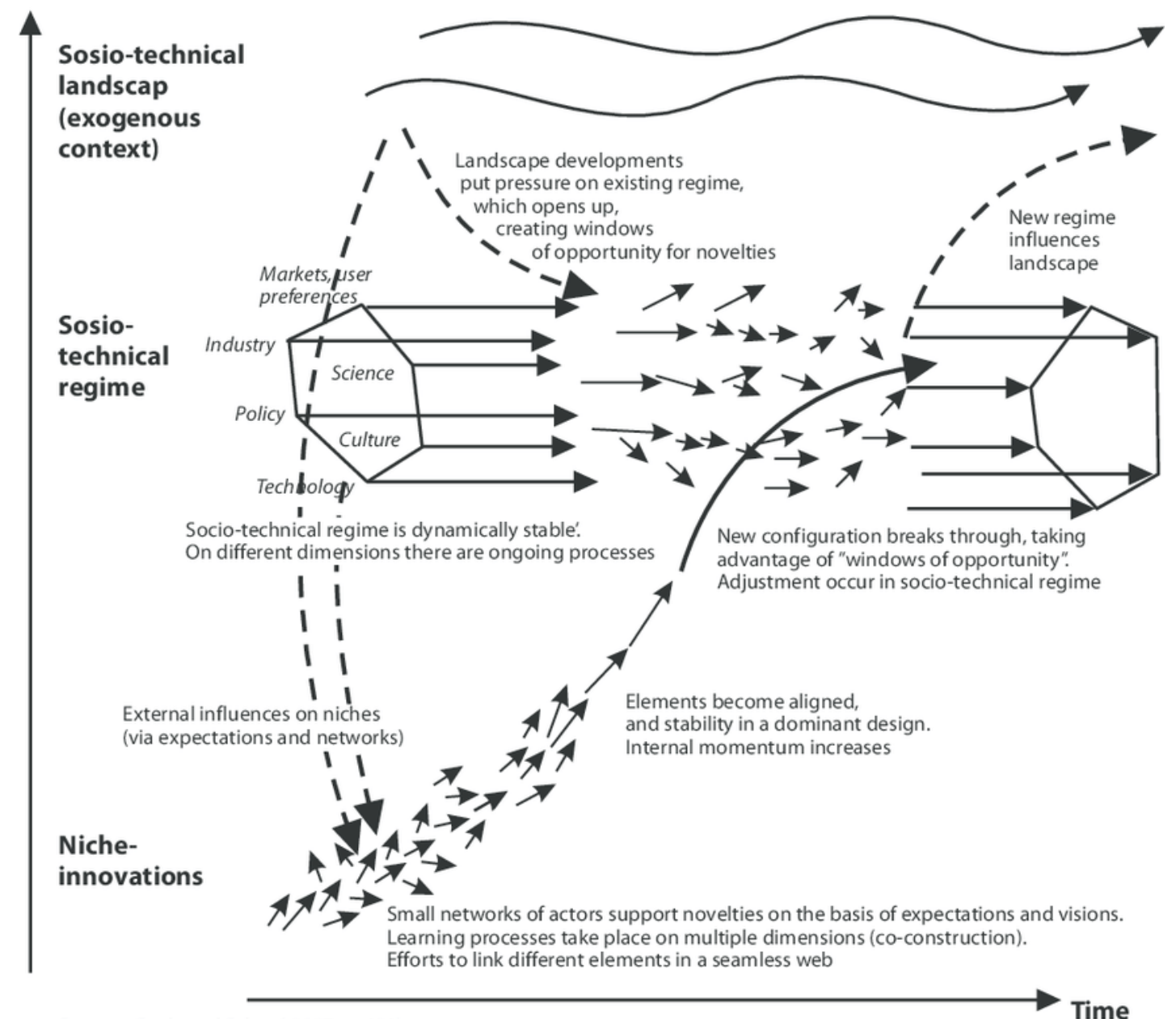


Figure 2 Geels and Schots own description on how the different levels of MLP creates pressure, and aligns. (Geels and Schot, 2007, p. 401)

3.2 Lifelong learning theory

Lifelong learning can be described as all the learning we do throughout our lives, how things interact with each other and how we develop skills. Manuel defines lifelong learning as

“all learning activity undertaken throughout life, with the aim of improving knowledge, skills and competences within a personal, civic, social and/or employment-related perspective”
(London, 2011, p . 3)

Manuels definition describes lifelong learning as all the activities we do in our everyday life that improve our understanding of how the world works. In this paper Manuel argue that we go through 5 stages of life from being a kid, where cognitive learning is the main point, to being an older kid where we understand feeling. Then we will develop into a late teen where we understand the difference of our own viewpoints, and that other people might have a different one. We will then develop into a autonomous and self driven, self governing person. Lastly, a point where we at the end know our own limitations of the systems we are in. (London, 2011)

Smith et al describes the learning process as self-planned, self-motivated, and self-regulated. However, it is often life-changing events / frame-breaking events where a new adaptation or demand is required. Here the community will seek to improve or gain new knowledge based on trends of others, which for example is the case regarding seeking knowledge about globalization, changing technology or focus on sustainability (Smith et al., 2007)

OECD points towards that there is a strong coalition between how well a city is doing economically and socially established on how individuals in the city can absorb and apply learning and innovation. (www.oecd.org, 2001) Here IBM points towards that a strong education focus on lifelong learning is needed to keep the skill level of the community and businesses high, as well as a diverse knowledge between the workers are required. (Dirks, Gurdgiev and Keeling, 2010) Commonly OECD and IBM emphasizes that lifelong education leads to better economy, social inclusion, and lower unemployment rate as well as an improved quality of life between the inhabitants in the city.

3.3 Wicked Problems

This project can be seen as a wicked problem since the project is rooted in a socio-technical change, where there are no binary yes or no answers. This is often seen when a project shifts from a technical or easily understood situation towards a project with social and or cultural nature. Those problems shall therefore not be seen nor solved as a traditional problem where the outcome is binary good or bad, but should be seen as a systematic change in the context in which the problem is seated. (Kolko, 2012)

Wicked problems often involve a plethora of different actors who all have a different background on which they make their decisions. Those can be historical, political, ethical etc. The agenda of the actors might be explicit in some cases and hidden in others. This complexity often result in a solution space that might make the situation in regard to the problem better, or might even make it worse. (Figure 3) The solution might finally also reveal or create new problems in the system that then has to be evaluated as their own wicked problem (Churchman, 1967).

By defining this problem as a wicked problem, I know that it is not possible to simply provide a given solution and expect it to work in our system. I therefore need to investigate the concept of the desired implementation, and furthermore find how the given concept will need to be changed into a localized context of Vallensbæk Municipality. This is needed since actors, their meanings, their religions, and cultures are established on who they are, where they are, and how they choose to live their life. Therefore, I need to find the actors in our given case that can support the concept, but also find the concept that can support our actors.

I have chosen those three theories, MLP, lifelong learning, and Wicked Problems since they will help us define how Vallensbæk Municipality is currently integrating a technology smart city into the municipality, and I can thereby also establish how one could integrate lifelong learning.

I have chosen to use MLP as my main theory due to MLP’s ability to describe the movement of niche innovations and their integration into the regime through the four transformation paths. This fits the situation of integrating lifelong learning into our regime, while no clear window of opportunity is present.

I use lifelong learning theory to find a given concept that will suffice the need for further development of lifelong learning in the municipality. I use this theory for the development of a prototype, and to establish if the prototype was successful in creating lifelong learning as described in theory.

Furthermore, I use wicked problems when case studies are analyzed, since the localized knowledge can be identified and re-defined in our local case.

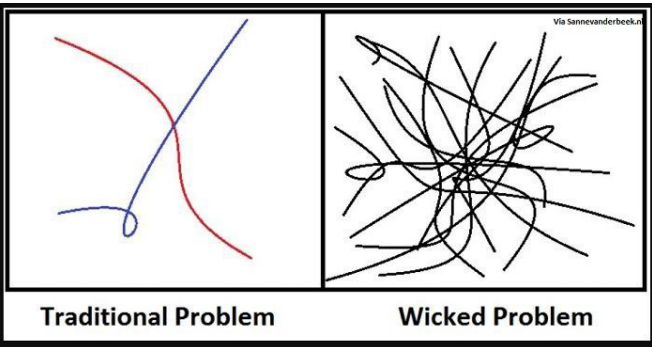


Figure 3 In this picture we see an illustration of how wicked problems often are entangled into a complex network, rather than traditional problems with an uncomplex system (Wicked Problem, 2018)

4. Methods

4.1 Double diamond

The British Design Council's *double diamond* framework is chosen for this project, due to the ability of the double diamond to take on a social complex problem. This framework can often be used when developing a solution for a wicked problem. A double diamond gives us the ability to discover information about a given problem, and define it into the localized space in which we are working.

After the problem is defined to the space, we can then develop a solution space where we explore the possibilities and deliver a product that will have a higher likelihood of becoming successful. Since we are working with a wicked problem in a localized space, it creates good conditions for the wicked problem of defining and integrating lifelong learning into a municipality, and afterwards develop and deliver a solution based on the information. (DesignCouncil, 2019)

double diamond is structured in 4 different phases: Discover, Define, Develop and Deliver.

The first phase, Discover is focused around understanding rather than assuming, in this phase we are striving to expand our knowledge field as wide as possible in regard to the problem we are aiming to solve. The define phase will give us a general understanding of how the system we are solving a problem in works, and what the relations within our system is.

When enough information is gathered, the next phase is Define. This phase revolves around sorting the collected information out and define the challenges within the system. We are making our focus convergent and locking down on the most important subject or problem, to work on in the next part of the diamond.

Develop is the first part of the second diamond, here we take the found problem and find different solutions and answers, we seek inspiration from the people within our problem frame.

Lastly Deliver involves the testing of our solutions found in the developing phase. Those will be small scale prototypes and here the goal is to out what solutions work better for the given implementation, and here an iterative design process of developing and delivering can help improve the finally delivered solution.

Double diamond works with the people first, it involves the people within the system rather than the things in the system since many systems can be described as chaotic where a solution that works in one place might not work in another. (Design Council, 2019)

4.2 Desk research

To establish a broad understanding of the field in which I am working, I have used desk research. This describes the practice of gathering data from books, articles, the internet, and many other places that are not the field itself. For this project I have used mainly online desk research since the amount of information available is vast.

Here scientific papers have worked hand in hand with information found on the internet, where the scientific papers haven not written about some specific niche innovations such as the use of green urban gardening in the context of lifelong living. Here scientific papers are promoting the use of gardens as a source for community and learning, can be linked to online official papers stating what they want to implement. (Managementstudy-guide.com, 2015)

4.3 Prototyping space

To navigate a complex design space, I have used prototyping spaces to construct a temporary solution space, where we can explore the possibilities of our invention. I have established a safe environment where the invention, prototype or object can flourish without outside complexity intervening in the doing of what is being prototyped. As prototypes are described as “means by which designers organically and evolutionarily learn, discover, generate, and refine designs”. (Rhino, Köppen and Meinel, 2012)

The prototyping space has three aspects to it, Staging, Facilitation, and Synthesis. (Figure 4)

In the staging phase, the facilitator has developed mock-ups, and prototypes that can be brought to the prototyping space. Those prototypes should be aimed towards setting the scene for mutual learning between the facilitator and the participants. (Pedersen, 2016) Here I have classified the prototypes and mock-ups as boundary objects based on the translation of knowledge by Carlile (Carlile, 2002)

The facilitation process describes the “doing” of the prototyping space, here the actors and the facilitator have encouraged a negotiation between the participants. The boundary object was created in the staging phase has created a common ground for the participants to understand and translate knowledge across. This will result in a better translation of needs, feelings, and meanings between the actors.

The synthesis describes the result of the facilitation process. This result has been based on the actors involved, the prototyping space and the translation and understanding of knowledge happening between the actors involved.

We as designers will often take this result and re-design the prototype and the prototyping space based on the interactions in an iterative form, thus refining and creating the prototype based on the actors chosen for the prototyping space.

4.3.1 Boundary object

Boundary objects are described as objects that plays an intermediary role between different social worlds. The object will have a flexible nature, where it can be understood in different complex social contexts but is also concrete enough to hold a common identity across said social worlds. This creates a common point for the social worlds where the object will be recognizable but have different meanings based on from which site the object is viewed.

Prototypes such as storyboards, mock-ups rapid prototyping and others alike are all seen as boundary objects since they will create a translation of knowledge between actors.

“Visualizing and prototyping play a significant role in designing. Early sketches and mock-ups, however rough or rugged, allow ideas to be shared and discussed” (Rhino, Köppen and Meinel, 2012, p.3)

Carlile describes boundary objects as having three different stages of knowledge boundaries, syntactic, semantic, and pragmatic approach, describing the understanding of each other. Syntactic approach can be seen as computer binary ones and zeroes, where the knowledge translated is at a minimum, but very precise. In the semantic approach, there is an understanding between people, and an understanding that our interpretation is based on different culture as well as different social worlds, here there is an understanding that individuals therefore have different meanings in relation to a given object.

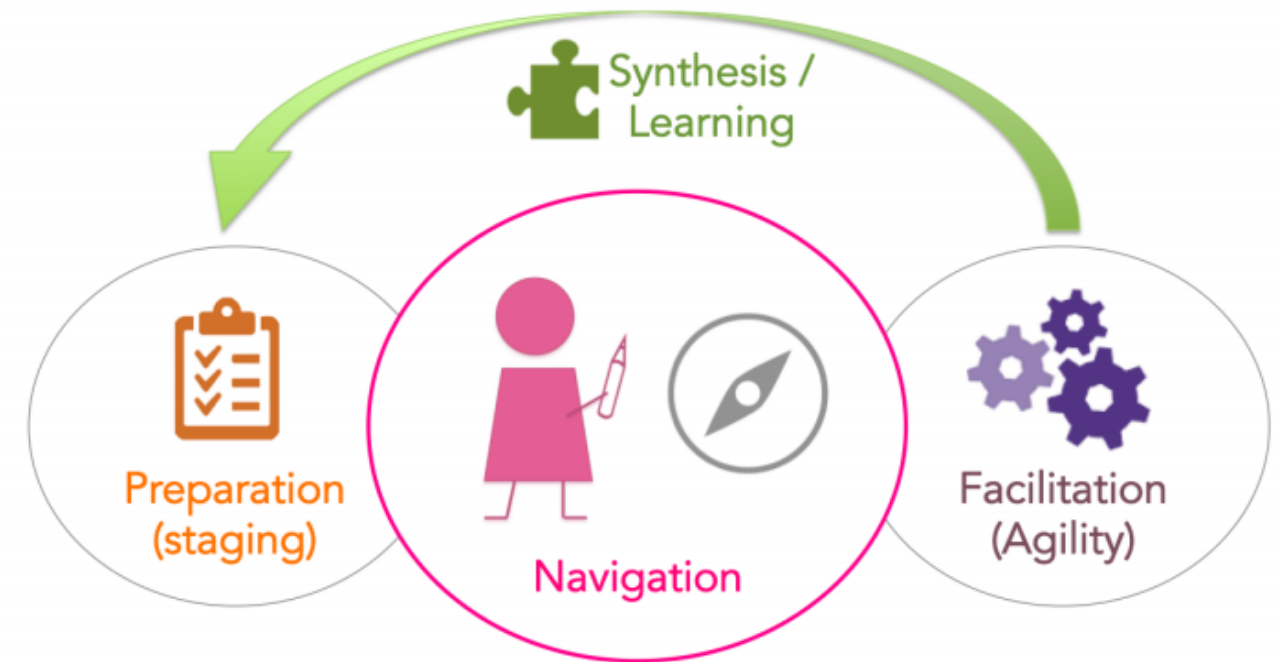


Figure 4
In this figure we see the navigation in prototyping spaces, that consists of Staging, Facilitation and Synthesis. (Pedersen, 2016)

In the pragmatic approach, we understand each other, and that our interpretation is different, but will combine what we know and what we learn into new knowledge that can benefit a design, an idea or a prototype. When creating a boundary object, the state in which the object is translating knowledge is vital. The object will move from the syntactic towards pragmatic as the translation becomes richer. Our goal is as designers to reach the right amount of translation, to thereby translate knowledge between actors most efficiently.

“They are reluctant to change their hard-won outcomes because it is costly to change their knowledge and skills. The cross-boundary challenge is not just that communication is hard, but that to resolve the negative consequences by the individuals from each function they have to be willing to alter their own knowledge, but also be capable of influencing or transforming the knowledge used by the other function.”
(Carlile, 2002. p. 445)

Carlile furthermore describes knowledge as Localized, Embedded and invested in a practice. He describes this as our knowledge being localized in a community of practice, where individuals with a common practice will share common consequences and problems and create common knowledge of a “doing” in that community. The knowledge we have is embedded in technologies, methods and practices we do.

We will create a new knowledge base on our practices and this knowledge will be harder to translate to people with other practices, thus hindering the translation of knowledge between actors (Carlile, 2002)

4.4 Semi-structured Interviews

During this project, I have used Semi-structured Interviews to not only gather qualitative data concerning my project, but also to gather valuable qualitative data on how people would interact with and would imagine the prototype to end up in a real-world scenario .

Due to the semi-structured approach, the interview only focuses on a topic, rather than specific questions. These topics and overall questions were, however, organized in prepared interview guides whereby a clear outline of the interviews were ensured. This approach allowed the respondent to create a more story-based answer, and share their experience associated with the topic in question. The responses were therefore often more in-depth, and you would as an interviewer be able to follow up on interesting concepts presented by the given respondent.

This leads to semi-structured interviews being more related to open dialog with a topic, rather than the classic strict interview.

The semi-structured interview has been used throughout this project to gain knowledge of the actors' viewpoints, frustrations and ideas of different topics. Additionally, I have used this to confirm that ideas and integration methods from other countries might be viable, and I have used it to find out what the actors roll in the implementation might be.

4.5 Survey

During this project, surveys have been performed. Surveys can be described as a self-administered interview (Lesley, 2012) where the user inputs the data themselves. The goal is to make the survey as easily understood and aligned as possible, but since participants from a different background might understand the survey from different perspectives, it is often recommended to use other instruments alongside surveys.

Surveys are divided into two main categories, qualitative and quantitative. Here quantitative is often the most used due to the ability to gain valuable statistics about a topic in a short amount of time compared to other data collection methods.

Quantitative surveys are often composed of closed questions with limited answers to ease the analyzation process further down the line. I have used this type of survey when needing to see if the population in Vallensbæk Municipality would find the topic of implementing urban green gardens interesting, and what they would like the urban gardens to configured to best suit their needs. The survey was done online, due to the circumstances, but if a replication would be done in a future scenario, a physical version would likely give a more representative result.

Qualitative surveys are the opposite of quantitative, where questions are leading against longer and more describing answers, this will give the researcher valuable insights into what is being researched. I have used this to get feedback from the prototyping space, where the respondents had open-ended questions, here the answered were analysed and follow-up questions were sent to the respondents when a question was answered unclearly, or when they struck an interesting viewpoint that I wanted to know more about.

This page intentionally left blank

5. Methodology

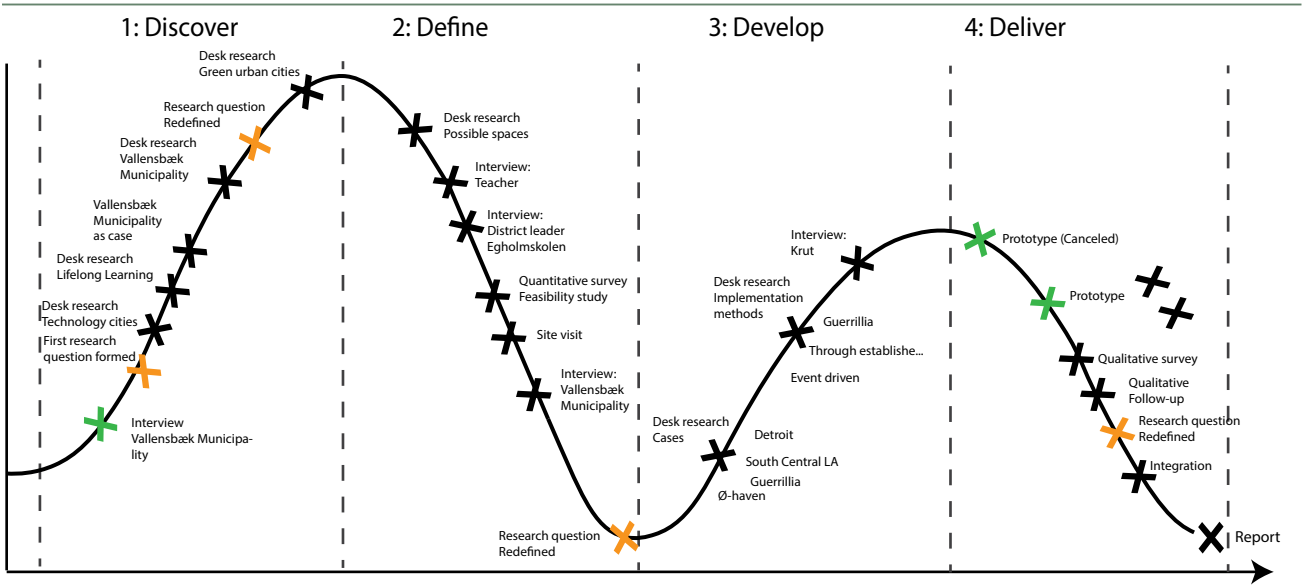


Figure 5 A double diamond where convergent and divergent interactions throughout the project progress. Own Illustration

The methodology of this study is following the Double Diamond (chapter 4.1) as my overall approach. This means that the first step for this project was to gain an overview over the field in which the project is working. (Figure 5)

Here, I started by using desk research in regard to how Vallensbæk Municipality is currently implementing “smart city”, what this will mean for the future of the municipality, and how this technological implementation unfolds compared to other smart cities around the world.

From here I investigated what a smart city is. What is the definition and how are other people using those definitions? One of the definitions of a smart city, focused on the citizens and the culture, inside the city, instead of the implementation of technology. This definition was proposed by UNESCO and was called a lifelong learning city.

I investigated this topic of lifelong learning and how it has been implemented in other cities around the globe, but found that this definition of a smart city was more resembling an ideological look at cities rather than concrete examples and implementation methods of what this implied.

I had beforehand looked at Vallensbæk Municipality’s technological implementation using Multi-Level Perspective and found that either a transformation path or reconfiguration path would result in the most likely adaptation of this ideological concept of lifelong learning.

Due to lifelong learning being a very small niche currently, I chose to use a reconfiguration path where I investigated the possibility to create a relationship with another niche that I have explored in an earlier project, where the path of integration into the regime is currently happening, and where lifelong learning can be a part of.

I therefore began studying Green urban gardens and the implication and implementation of those. Here most of the ways of implementation has been done through some sort of guerrilla gardening, where the individuals have made the changes without consulting the city or municipality, and therefore fewer articles have been written about the topic. Therefore I chose to focus on people who are doing it, rather than the articles themselves, and chose a few case studies for this paper that were the most representative of the information, some being guerrilla gardening, and some in collaboration with local actors.

This resulted in a move towards the other part of the double diamond, being my solution space. In this space I firstly needed to assess whether or not Urban gardening could be implemented into the solution area.

I therefore conducted a survey at the local Facebook group for the municipality. Here 42 answered the survey and due to the amount of positivity around Urban gardening, I continued along this route. I looked through different ways other social groups, municipalities, and cities had implemented Urban gardening, both in Denmark but also around the world to see what possibilities I would have when the implementation phase was reached. For the implementation phase, I chose to conduct interviews with relevant actors such as teachers, the official responsible for the integration of smart city in Vallensbæk municipality and a participant of a learning event related to aquaponics, living in the USA.

I then chose one of the three implementation methods, that being event-driven for prototyping purposes and created a prototyping space, where I was the facilitator of a small event. This was done as a probe to find the values of the people participating in those type of events in our given geographical location. I furthermore restricted the event to be only families living in an apartment area, since my prototyping space would be very relevant to those. In a future study, one would also study the families living in other types of homes than apartments since those also would play a big role in the implementation.

To evaluate their perception of the event and what they would like to change I used a qualitative survey with open-ended questions where the participants can turn the question towards what they wanted to say, much like the semi-structured interviews. I have afterwards contacted the participants with follow-up questions and had them elaborate on the most relevant topics.

6. Empirical research and analysis

To establish a broader understanding of the future city development path, I have researched what I found to be three main topics in future cities, that being automatization and technology-driven cities, Lifelong learning cities, and green urban cities.

Those topics are chosen given that the current path of Vallensbæk Municipality is going towards a technology-driven city. The municipality is implementing smart garbage dumps, smart intersections and many other IoT devices throughout the municipality (COK, 2017). The overall goal for the implementation of smart technology throughout the city is to increase the quality of life for the citizens by for examples having smart street lights that is only activated when required, self-driving busses, and sensors in the school classrooms to monitor air quality etc.

OECD has created an index measuring the quality of life around the world. They value categories like education, housing, income and many more. Denmark is currently one of the higher-ranking countries and our goal is to keep Denmark as high on this scale as possible. (Oecdbetterlifeindex.org, 2016)

One way of doing this is to invest in lifelong learning as proposed by UNESCO. They focus on how citizens can educate themselves throughout their life, and how this can create a more resilient community, with a higher degree of happiness and quality of life (uil.unesco.org, 2019). I therefore investigate what lifelong learning is described as, how it is implemented and what a true meaning of "lifelong learning" could be.

Lastly, I investigate the topic of green urban cities, where I focus on what green urban city is, how it compared to other cities, and what the implications for those are. To this extend, I also investigate how this is tied together with Lifelong learning and the OECD quality of life index.

6.1 Future scenarios of cities

6.1.1 Automatization and technology-driven cities

When we're looking at the future scenarios of cities, I can see some themes and trends that are predictions of what the cities will focus on, and how they will change the everyday life for the inhabitants in the future.

Automatization is one a key aspect in how cities as well as manufacturing will run in the future since we as a species often strive to do as little as possible for as much outcome as possible - we call this efficiency. One place where I see this in Denmark is in the local supermarkets where "scan & pay" is being introduced by Coop. It is currently marketed as a fast way where you can do everything yourself, and therefore have a lesser chance of infecting others in relation to the Covid-19 pandemic, but if we look broader, it is just the cashier being replaced by you scanning your own products and pay with your phone instead of needing another human to do so, meaning a smaller need for personal inside the shop. This concept was easily adopted during the COVID-19, since it provided no need for physical interaction between people, and since the "scan as you go" does not require you to unpack your groceries, only to pack them again seconds after (coop-medlem, n.d.).

Industry 4.0 (and 3.0) is another place where I see both local production and automatization currently getting adopted. Here the production level can be defined by the demand instead of guessing how much is needed, and real-time sensors and monitoring systems can ensure that the production can run as "dark production" meaning that since no person is needed for the production process, products can be created by robots throughout the night (Spectral Engines, 2018).

Therefore, a greater amount of automatization throughout the future of cities are likely, where simpler jobs like cashiers, fishermen, production workers ect. will be replaced by their automated robot counterparts (Frank et al., 2018).

However, also an increase in people who needs education or re-education to manage and control the robots working since it takes a skilled worker to use a robot correctly are likely, but when done correctly it can result in far better use of both the costly human wage and resources.

6.1.2 Lifelong Learning

Lifelong learning can be seen as a goal or an ideology that revolves around the idea that everyone should be able to learn at any point in their lives. This ability to learn should furthermore not discriminate across gender, age and other factors alike.

UNESCO (United Nations Educational, Scientific and Cultural Organization) are in the forefront of promoting Lifelong learning, stating that cities made for lifelong learning can combat poverty, unemployment, inequality, environmental threats as well as health risks and are generally more resilient to change. (uil.unesco.org, 2015).

While “lifelong learning” is an older term and has many variations of said term (such as learning city or learning culture), they all describe an area or community in which learning throughout your life should be not only available, but also encouraged. The reasoning behind focusing on cities rather than nationwide is due to the general city construct. Here many people are living close to each other and contains also buildings and institutions that can facilitate this lifelong learning. Here public schools, universities, local businesses, gardens, makerspaces, the public libraries the internet and many more, are able to give people who are seeking it, basic knowledge about a given subject (London, 2011).

The creation of knowledge is one of the most important assets we have in society, and in a small country like Denmark, knowledge is vital since our country does not possess any physical resources like minerals or oil, why the future economy are dependent of the focus on knowledge and science as our main selling point (Risgaard, 2019).

“Knowledge is the most valuable thing we have to give. We are so quick to question the cost of things, but often unwilling to explore their true value. But value is so much more important than cost. The public domain is the grand sum of freely available human creativity and knowledge. Not only is it ours to enjoy, but also to build upon and use. But all too few have access to these works.” (Medium, 2017).

One can thereby not only look at knowledge as a societal strength, but also as an industry in its own right, where Denmark will have to keep a high standard to keep being competitive in the future.

6.1.3 Urban gardening

The future of cities points towards the use of the available urban space for farming.

This will be done in a more pronounced way than currently or throughout history.

Copenhagen is currently at the forefront of what is being done. For example, “Gro Spiseri” is serving food which is solely grown on their own rooftop instead of importing the vegetables and fruits etc. from outside the city (Gro Spiseri, n.d.).

This makes for a more local restaurant and is marketed as a “family style” restaurant, where the menu changes depending on the season, but where the food is always as fresh as can be.

As seen in the case studies described in the later chapter “Case studies”, I found that urban gardening is happening whether or not the municipality wants in. In this regard we see activists as well as the municipal workers pushing this green agenda into the city.

This adoption of urban gardening and greening strategies are commonly implemented to create a greener image for a city, but can also be linked with other valuable changes such as reducing environmental degradation, better accessibility to fresh produce, lower levels of air pollution as well as a psychological benefit from being in a greener area rather than a concrete one (Carlet, Schilling and Heckert, 2017).

As a result of this, the inhabitants of the city will have improved work performance, better cognitive function, learning abilities and memories (Wolf, 2010).

One problem with urban gardening is that, even though they can provide high yield and

have a large output of produce, it is often not as sustainable as people think it is, since a high output green farm is often linked with a greenhouse, hydroponics and grow lights for the plants to thrive as good as possible (McDougall, Kristiansen and Rader, 2019).

This use of grow lights will result in high energy use and will therefore be less sustainable than simply growing the produce elsewhere and transporting them into the city. This concept can also be seen in this article, where “Politiken” concludes that Danish grown tomatoes use vastly more CO₂ than tomatoes grown in Spain, due to the heating needed in Danish greenhouses (Dilling, 2016). If done correctly, and the right crops are chosen, the green urban gardens can, as seen with Gro spiseri and our case studies, however, create more value in other spaces than merely growing produce for us.

When looking into the planetary boundaries provided by Stockholm University, we have a high risk of losing the biosphere integrity, meaning the Genetic diversity or simply a loss of biodiversity (Stockholmresilience.org, 2012). In another project, the group found this to be one of the most important factors along with the improvement of mental health and the air purification function of plants. Green urban gardens open a realm of possibility for the biodiversity to jump from one green space to another, even when moving inside the city, and we will be able to withstand the climate changes in that regard better. Plants are currently a big part of the city and will become a greater part in the near future (Schneewies et al., 2019, WUR, 2018)

6.2 Research summary

When investigating the problematization through the use of Multi-Level Perspective (MLP), I will see that lifelong learning has been a part of the Vietnamese culture for a long time, and that the adoption into European and American cities has been tried before during the 1990s, but have failed to do so. (Yarnit, 2015)

At this point in time, I see a lifelong learning city as a niche innovation since they only have been successfully implemented a few places around the world, but mainly in Vietnam. Since UNESCO could integrate the agenda about lifelong learning into the regime of daily life for the inhabitants in these cities. (Anh Dang et al., 2010) The main actor for pushing the agenda of lifelong learning into the regime of daily routines. is UNESCO, who sees this as an important part of future city planning since there are other technologies taking hold in the regime such as Artificial Intelligence, dark production/automated production of goods, industry 4.0. (Corporate Finance Institute, 2018)

All of those technological niche innovations have one thing in common, and that is the demise of the simple jobs such as warehouse workers as seen in the amazon warehouse (Simon, 2019). In Coop Denmarks stores, for example, Scan & Betal (scan & pay) has become a part of the regime and our daily life, in creating a faster shopping experience in many of their stores (coopmedlem, n.d.).

The simple jobs will simply be automated away, and the population who are currently employed in those jobs, will need to find different new jobs. Here there is a common disagreement in opinion whether robots and automation will create more, or less jobs than they will displace (Archer, 2018).

Lifelong learning is as stated a niche innovation at this current point in time, and will unlikely become a part of the regime of our daily life if it is not promoted by the local officials.

Doing this will force it into the regime, in the same way changes got forced into the regime during COVID-19 where schools got closed (Politi, 2020) and the need for innovation in home-schooling quickly got adopted into the regime. For the state of lifelong learning, I would need our regime to be destabilized in the same way the pandemic changed our school system (and many other regimes). The destabilizing of city innovation and learning communities does however not seem to be happening during the period of this project, since it hasn't happened during the last 20 years.

It might however happen when the aforementioned automatization of production happens, and unemployment rates might rise. For lifelong learning to get adopted a pathway needs to be created, and thereby a symbiotic relationship with another niche that is on the brim of adaptation into the regime. This is where Urban gardens come into play. During the DDT ban in 1970, many people started to question what was in their food regarding pesticides and other additives. This created an opening for local food productions such as urban gardening, despite it being many times less efficient in comparison to the industrial counterpart.

Urban gardening has since been a part of many cities and is therefore also a part of their regime, such as with the case of Ø-haven in Aarhus before it got moved to another place nearby and will be opening this summer (2020)(Ø-haven, n.d.). This is however not the case in all places - Vallengsbæk being one of the places where this is missing. We can with this relationship try to implement both lifelong learning and green urban gardens at the same time, thus create protective conditions for the lifelong learning niche to get hold in the regime. In line with this, combining lifelong learning with other rising niches - such as the change in libraries from being a book related to becoming a more general information center and combining it with the use of makerspaces and alike - will strengthen the culture of lifelong learning and incorporate it more deeply into our society.

For this to happen creating a network of actors supporting the case is needed. Here, urban gardening again seems to be a viable symbiotic relationship, since the act of gardening is often solely associated with something to do in private house or in a courtyard or on a balcony when getting an apartment.

Here, we will be able to negotiate with a group of actors related to gardening and growing, and give them and their niche a stronger foothold regarding the current regime and make their as well as our niche more adoptable in the regime, redefining the act of gardening into something that can also be done in the city.

The reconfiguration of the current regime where lifelong learning is a part of it will take a substantial amount of time. This is due to lifelong learning being a cultural change in our lifestyle, rather than, as technology, simply replacing things with a smarter version that makes our life work in the same way, but only with slightly more information than before. The implementation of urban gardens will therefore further not create a measurable change in short time in regard to lifelong learning, and will only be measurable years from now.

This figure (Figure 6) illustrates how I interpret the current Landscape, Regime, and the three niches

I see landscape changes that puts pressure on the regime, opening up windows of opportunities for our niche innovations to become part of the regime. I have through my desk-research found what I believe to be some of the most important Landscape changes we are facing are:

- Climate change with a warming globe, due to a higher amount of Co2 in our atmosphere.
- I see what Stockholm University describes as the planetary boundaries. (Stockholmresilience.org, 2012) where the main problems in regard to this project is a lack of biodiversity, an overuse of the minerals used for farming (phosphor and nitrogen). We are currently using upwards of 50% of our land in Denmark for farming. (Ritchie and Roser, 2019)
- The Pandemic of Covid-19 has created a strong pressure resulting in the adoption of many niches into the regime

The regime we are currently working in is the regime of our daily life. This involves how we shop for food, how we use leisure time, how we study and the work we do ect. I will use this as our regime since our niches all are impacting this regime.

The niches I have investigated are described as follows: (Picture 6)

I see lifelong Learning (purple) in the bottom, since this, while embedded in the Danish culture, is still not designed for in this municipality. Here, the purple arrow symbolizes the relationship it will need to create with Green cities, to have further chance of adoption into the stable regime.

Green cities (green) are already a current part of the regime in many places and might therefore be easier to integrate since it is not yet a part of the regime in Vallensbæk Municipality. Some of the greater landscape changes that provides an opening for Urban gardening is of course climate change, and from there also the lack of biodiversity shown in the planetary boundaries (Stockholmresilience.org, 2012). This as well as our increased focus on land used for farming resulting in deforestation (Meek, 2019).

Technology-driven cities are currently in the process of being adopted into the regime. The reasoning behind this is that the adaptation method is a transformation path, where the current regime can be modified slightly and thus easily integrate the technology in increasingly more fitting places, until it has become a part of the regime. Technology driven cities are often focusing on resource optimization of human work, where the simpler repetitive jobs can be phased out of what we qualify as human jobs.

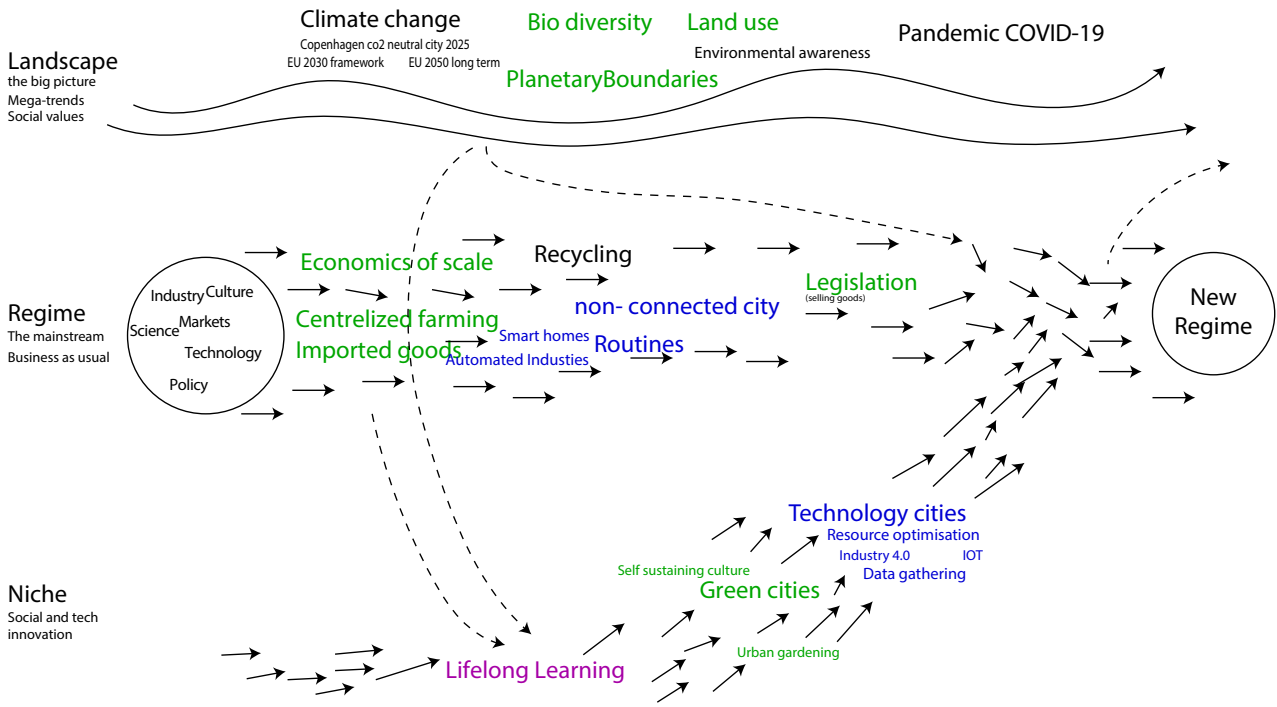


Figure 6 An illustration of how I interpretate the current Landscape, Regime and Niche innovations. Own Illustration, based on (Geels and Schot, 2007, p. 401)

6.3 Case studies

To understand how cities around the world have used the technology of urban green gardens, I present three different cases where green urban gardens has presented themselves as valuable for the community in which they were implemented. After the presentation of the cases I create a summary of what has happened in these cases, and how it relates to lifelong learning as well as our chosen theory.

6.3.1 Detroit

Detroit is a city that strived and blossomed throughout the industrial revolution but has since become an environment where poverty is a dominant theme, Devita Davison explains in her ted talk (Davison, 2018). She describes how Detroit had a scarcity of retail and fresh food, how many of the inhabitants were overweight, and all of this happened in only 50 years. Detroit went from being a popular industrial city with around 1,8 million inhabitants at the highest point to a problematic area with only 0,67 million left and little future (US Census, 2019). The local people looked into what the city had to offer and focused on this: they had land. Detroit's urban area spans around 3.300km². Here a comparison with Copenhagen, the capital of Denmark with a similar population size of 0,6 million is only 300km² (US Centus, 2017) , (Danmarks Statistik, 2019).

Poverty in Detroit was very high and thereby many people were available for work. Here urban agriculture came into play since this fostered entrepreneurship, work, products for the community, healthy food and many other positive things to the community.

In Brightmoor, one of the places with higher poverty in Detroit (State of Michigan, n.d.), they created a store called Brightmoor Farmway Detroit, where they focus on the collaboration between the local actors, that is mainly the local farmers, chefs, and the consumers. This has resulted in a common house where walks in the area are arranged, where food is given out to the poor and where a relationship between the local fish and chips shop, the local brewery and many others have been created (Neighbors Building Brightmoor, n.d.).

From here on out Detroit once again found a way to flourish, a way to create a city for the people living inside. Since then, the neighborhood has only grown bigger. Detroit has created what many look like a new way of creating an urban, self-sustaining city.

"Instead of living on or near a golf course, San Francisco's tech giants can live near a unique farm-to-table agrihood, where they walk out their front doors to pick the fixings for their avocado toast." (Adams, 2019).

They look at this as a future for urban planning, where the resources used in the city are grown from the city (Smartcitiesdive, n.d.). When looking at this as a possibility in Denmark, the chance for a full-blown Detroit movement is rather low given the 11:1 difference in m² per person, making Copenhagen and the surrounding area much more dense than Detroit. Another reasoning behind this not happening in Copenhagen is that Detroit had a strong need for change since the population was almost evacuating the city to live elsewhere, and this is not the case here.

What I can learn and use from this, is how they mapped out the local resources in the area and used this to their advantage. This is a key component when translating knowledge in a local area and create a space where niche innovations such as urban agriculture can be adopted. To do this, they created an interest in the topic by providing healthy food and jobs to the people, and by investing in the local area. By doing this they also taught people valuable skills such as how to grow and maintain crops, but also how to run a business, how to interact with business partners, how to advertise your produce at the local markets. This knowledge is now locally grounded and will help people who lived in economically, socially or also knowledge poverty to gain a foothold and change their life, providing equal opportunities for acquiring basics skills, and a social network to thrive in.

In Detroit we saw a de-alignment when big car manufactures chose to leave the area, changing Detroit from being one of the wealthiest cities to one of the poorest, further resulting in poor health, and high unemployment rates. (Quora.com, 2014)

This created a window of opportunity to whatever niche could fill the role of creating jobs, health and economical growth. Here the niche of urban agriculture took advantage of the vast spaces of now un-used land, and furthermore created communities of practice around changing their neighborhood into an agrihood. The niche that was integrated into Detroit, was however not the same as when we think of growing food in general.

This niche does also focus on organic agriculture, that due to the DDT ban, has become stronger and helped the adaptation of the niche even further towards the regime. Thus creating an alignment between the landscape changes happening in Detroit being the big companies and thereby also the population, abandoning the city, the resource of land begin accessible, and a niche that are able to combat the de-alignment and create a new alignment with the niche within.

6.3.2 A guerrilla gardener in South Central LA | Ron Finley

In South Central, or as it is recently renamed to, South Los Angeles (LA), there is a big problem in the community. South LA is what is commonly described as a food desert. As a result of this, it is often a long drive to get fresh produce not filled with pesticides. This creates the problem of obesity, a very curable disease. With no healthy food in sight, this disease is however deadly. This became a huge problem after the central 13 acres (52.000 m²) community garden was put down, only to be replaced by a warehouse (Lui, 2019).

As a result of this, Ron Finley, a fashion designer, started to grow food on the curb. He was told by the city that he had to maintain it, and he wanted to maintain it and grow food as well. This was, however, characterized as illegal use of public space (Crouch, 2015). He later won the legal battle against the city, with great coverage in the news and 900 signing protesters, and could therefore start growing food in the streets. This sparked a green revolution around the neighborhood. Since the healthy local food is now freely available, he encourages others in the same area and hopes for this to result in a “food forest” rather than a “food desert”. The gardens provide much more than just the food, since they provide a boundary object for people in the neighborhood to have educational conversations about bigger problems in the local area.

“Aren’t you afraid people are going to steal your food? No I’m not afraid, that why it’s on the street, that’s the whole idea, I want them to take it, but at the same time I want them to take back their health”
(Finley, 2013, 6:50)

By creating a community around the plants he grows, he creates a knowledge-sharing machine that provides a basic education about both agriculture, politics and health, allowing people to teach their kids how plants work, how different species of animals and plants are dependent on each other, and we as humans are also dependent on other species. How the food we eat creates a healthy body, and how you as an individual can make a change not only to yourself, but also to others.

“If kids grow kale, kids eat kale, if they grow tomatoes, they eat tomatoes, but when none of this is presented to them, if they’re not shown how food affects the mind and the body, they blindly eat whatever the hell you put in front of them.”
(Finley, 2013, 7:45).

When we as people are presented with information of any type in our everyday life, we will slowly learn about it without even knowing, and if we interact with it, we will learn even faster. By presenting both kids and adults to guerrilla gardening, urban farming, or any other type of publicly available subject of interactive nature, we will gain knowledge. This does not have to be done in the same way as in South Central LA where the plants are grown in the sidewalks and curbs, but growing wherever possible should be encouraged and become a part of the city both for learning and for the local production.



Figure 7 This picture shows one of the many signs from South Central, when their local green garden and thereby their health got replaced by a warehouse (Crouch, 2015)

From South Central LA I can see another path of de-alignment when the government took away the local farms from the people and made them into a warehouse. This threw back South Central LA to the food desert state it once was, and a place the citizens urgently not wanted to be part of. They therefore started growing food where they could, and the community backing this up resulted in a legislation change that made it legal to use the urban space for the production of food. Here the government took away a - for the citizens - vital part of the regime, that would need to be fulfilled by another technology. If the government had supplied the citizens with another space to grow, or the

supermarkets had plenty of fresh fruits and herbs, the niche of growing food in the street would most likely never have been adopted into the socio-technical regime.

6.3.3 Local gardens in Denmark

In May 2014, Ø-haven was created in Aarhus. They created urban gardens for the locals living nearby. They had almost 100 signed up for one of the small gardens within the first day, before the gardens were even created, and already then, people looked forward to the community it will create during the warmer months (Bull Nyvang, 2014). Later the same year, Ø-haven started to get more traction by creating kick-off events and the garden flourished and became a part of the culture.

Over the next couple of years, Ø-haven developed and matured, it spread to growing muskels in the local harbor exploring new ways of using the space for more than just gardens, such as a leisure space, they created a by-høst app (city gatherer app) where people could see what plants were grown urbanely in the city. Ø-haven had a very active Facebook group accompanied by an Instagram page, which was used as their source of information, alongside their website oehaven.dk. Ø-haven became a part of the "smag på Aarhus", a publication based around places to eat in Aarhus in 2016 and was therefore further adopted into the social circle.

This did, however, end in 2018 when the gardens got closed. The closing of the gardens was due to the project being built from the start at a soon to become building space. The concept was however revived only a short time after and is partnering up with the local municipality and 3 other companies too, in a space called Ø-linjen; a green area in Aarhus-Ø, where people in the future once again can rent a small garden and grow food inside the city.

In Denmark we do, unlike Detroit and South Central, not have any problem getting fresh herbs or fruits. Nevertheless, there was in this case plenty of unused space on a Harbour in Aarhus, which created an opportunity for a small union to be started and supply a local opportunity for gardening. They have over the last 4- years grown bigger and bigger. When Ø-havens space was closed down due to the construction of other spaces, they had become a part of the regime and could thereby re-gain their urban growing space, only in a different location.



Figure 8 A picture of Ø-haven shortly after the first kick-off workshop (Oe-haven, 2014)

6.4 Case study - Summary

In the above I see three different cases of implementing green urban gardens and how they all became a part of the regime. I do, however, have to take the confirmation bias into consideration. (Cherry, 2014) The most pronounced stories are never the ones where you fail multiple times – it is the stories of success. Nevertheless, I see the movement of urban gardens going from a niche towards the regime in many places around the world, and can thereby state that it would be a feasible route to go when wanting to create a symbiotic relationship for the integration of lifelong living. I therefore investigate if the citizens and Municipality of Vallensbæk is interested in this niche, and thus also in adopting it into the urban space.

I can see in the both the case from Detroit and from South Central how the people who are joining the gardening concepts in becoming the new regime learn from the implementation as well. In Detroit, people are learning how to grow, how to sell and how to create a business for themselves, which was not a possibility before these implementations. Thus, they are now using their land for the better, and will still in the future be innovating around the adopted concept. Maybe they will adopt hydroponics or aquaponics, or find a way to use their land even more efficiency. The value they create for their city, is also where they will be self-driven in finding new knowledge to make their life easier and their crops more fruitful (Smith et al., 2007).

In South Central, the environment in the city is now changed. What you see in the streets is changed, and when you're walking around in a green neighborhood, you will likely adopt some of the knowledge based around this by simply being there. When you walk with your kids down the street, they will most likely be curious and ask if there is something they do not know, since having the learning being physical right in front of you makes the task of learning even easier (Poulsen, 2020).

Ø-haven is, even though it might not be as visible as the other two cases, also translating knowledge to the users of the concept. This can be classified as a simpler knowledge transfer that can happen between neighbor planters, where plants they grow, how they grow them and what they use them for can be translated. Ø-haven does, however, work more in the realm of a networking device between actors.

7. Solution space

7.1 Feasibility survey

To establish the possibility of an urban garden in the area of Vallensbæk, I surveyed the inhabitants of the municipality. In this survey, I asked who would in general use an urban garden if it was available, how they would like it to be financed, and if they would like a public aspect to the area as well. Lastly, I asked them whether or not they would like a learning aspect to the garden, where they could learn about both the common Danish plants, but also other plants that are not native to Denmark.

However, the total number of respondents to this survey adds up to no more than 42, meaning that the true result for the entire municipality might vary significantly from the one sampled here. (Feasibility Survey, Appendix p. 4)

In the survey, I did however see 88% wanting to use an urban garden if they had the possibility. I find this interesting since this result is a lot higher than anticipated. This could be a result of the respondents being part of a Vallensbæk Municipality Facebook group, meaning that even though it is a common group for the municipality, the people answering the survey are already interested in what is happening in the municipality, and the people not answering will simply turn away from the survey, and therefore not show up. Wishful thinking might also be another factor, where people will answer from what they feel rather than facts, and when it comes to actual subscribing to a garden, they might not show up, despite providing a positive answer. Here a more forceful approach, like asking people on the streets might have provided a better result, but was not possible due to the ongoing pandemic.

During this survey, a majority of people are setting the max distance from home to garden at 200-500 meters. They say that they would be willing to pay a monthly fee, but they would assume the basic tools to be available to run the garden. When asked if they would like a learning part to the urban garden to be available such as infographics of commonly grown plants, events, or other information related parts 90% of the participants stated that they would like this.

As stated earlier in this chapter, this survey is not representative for the entire population of Vallensbæk Municipality due to the conduction of the survey, resulting in a rather small sample size, and the participants having a good possibility to be creating a bias towards urban gardens. This survey might therefore not show more than a tendency towards a wish, for an urban space, but does however show that the participants are people who properly would engage in the activities associated with a green urban gardening.

7.2 Three Possible ways of implementation

In the following chapter, I have investigated three different ways one could implement green urban gardens and lifelong learning into Vallensbæk Municipality. To do this the implementation method, a window of opportunity is needed, as well as creating an alignment between the implementation, seen as a niche innovation, the regime and the landscape.

7.2.1 Through already established institutions

One way of supporting lifelong learning in the municipality is to change the way current institutions are facilitated. Currently community centers and libraries are being used for learning events over most of Denmark and are good examples of primary sources for lifelong learning. But here other spaces could also facilitate this. One example of this could be the local schools, where school gardens have not been implemented.

If a school were to implement urban school gardens, why should they not include the local community in the learning environment? Doing this would not only be beneficial for the local citizens who live in an apartment and therefore have limited access to gardens where they can plant herbs and spices or for example flowers. Many people in the area who have gardens, have very limited garden space and would therefore have a similar problem as the people in apartments. The combined garden would also be beneficial for the school, since more people using the garden would presumably mean that the crops are watered and cared for more often than if only a couple of teachers were to do this. The cost of implementation could be split by the municipality and the school making the garden bigger and more vibrant in the selection of growing methods such as raised beds or hydroponics.

During my interview with the Department Manager of Egholmskolen, a public school in Vallensbæk Municipality, she did however mention that having an open garden to the public might be problematic since there are many troublemakers in the area. This could be a problem, but measures could be implemented to deterrence the troublemakers such as a keyed gate, surveillance, or only allowing parents with kids at the school to become a part of the system.

7.2.1.1 Interview with the Department manager

Through my interview with the district leader of one of the three public schools located in Vallensbæk Municipality, we discussed the possibility of how a school could work together with the communities around them, and co-develop a solution.

She pointed out that by doing this, the school would save money since some of the space would be sponsored by the municipality, and here fences and tools would not be needed to be bought more than one time per item.

She did however have a concern regarding the space itself since it would be opened up to the public, and here older kids from the school or other troublesome kids could potentially destroy smaller kids' plants. Overall, she saw a potential in the concept, since maintenance and the up-front cost would be lower, but was worrisome of the space being open, and people from the outside coming into the space (Interview with District leader Appendix p. 6).

After this interview the District leader asked for a concrete implementation plan and price for the school alone, due to a need of something tangible when presenting it to her steering group meeting. (School gardens in Egeholmskolen Appendix p. 11-14)

7.2.2 Through local events (IDA, LYNGBY)

One example of this is IDA, the Danish Engineering Association who is the facilitator of many events including how mortgage for your real estate works, coffee or gin tasting, how to become a better leader etc. (ida.dk, n.d.) The events facilitated are mostly being held elsewhere than their own building, such as a local bank, a nearby brewery, or whatever location fits the course/event.

Those events have a great potential since they not only facilitate interesting knowledge to people, but they are also showing off the local companies, what they do and where they are, gaining both interest in the company as well as potential new costumers who didn't know this place existed in the first place. For example, events like those could be held at Spisestedet Mosen, which is one of Vallensbæk's upscale dining areas, who could host a tasting, or a look into how they use locally sourced food. The same workshop could be held by Restaurant Krabben, a local seafood restaurant located by Vallensbæk Harbor.

In similar fashion bigger companies like Dronervolt, one of the big companies in Vallensbæk who specializes in drones and does SAR (search and rescue) missions, could facilitate a workshop showing how they work with drones, and what drones can do for us, and how drones will impact our future.

To facilitate and coordinate the workshops, Vallensbæk Culture and Citizen house would be the big partner here. The community center is currently facilitating all of the common events, but are mainly focused on sporting events for the elderly, such as swimming or walking football. They are also facilitating "babybio", where movies are shown for kids (Vallensbæk Kommune, n.d.).

The current activities are few and far in between, and lacks the whole 16-45 age range (considering that most kids under the age of 16 are doing sports at the local schools). Here, the facilitation of workshops with the local companies could help in making life-long learning culture more embedded in the community.

Vidensbyen Lyngby (Knowledge town Lyngby) – is an institution who has already implemented this just north of Copenhagen. Here people are able to sign up for local events hosted by local companies showing off new technology, the everyday life in the companies, student life in Lyngby. (where DTU, one of the biggest Danish universities are located) Vidensbyens events have focuses like urban development, entrepreneurship, mobility, small business, only to name a few. (Vidensby, n.d.)

7.2.2.1 Interview with Kurt

During my study of event-driven implementation, I interviewed an individual named Kurt, who is 53 years old and live on the countryside in the US. I got in contact with Kurt through a mutual friend, who heard about both Kurt's participation in the event as well as my project.

Kurt was a part of an event published by the University of Nebraska, where they created an event based on Aquaponics. They created a small system and was educated about what plants and herbs would thrive in this system. Ultimately, they went over the implications of aquaponics in regard to creating a system for your family versus creating one as a business.

Kurt lives in one of the many food deserts around America, and on top of that, water is also scarce. Therefore, aquaponics and hydroponics make a lot of sense to use compared to growing in dirt, due to the decreased water use.

Kurt had before seen this way of growing food on social media like Facebook beforehand, and had done some research himself, but most of the solutions currently available for purchasing are either for 1-3 plants like the product "click and grow", or are of industrial proportions and will cost upwards of 100.000 USD with no solution fitting to his situation (Interview - Kurt, Appendix p.5).

Early this year Kurt got invited into this event concerning aquaponics. Since he attended to this, he has been creating small test setups in his garage, and is planning on building an outdoor greenhouse, where he can start a small business of growing and selling food locally (Interview - Kurt, Appendix p.5).

Kurt finds these types of local events very interesting and identifies huge potential when the topics are interesting, fun, and maybe also profitable. Nevertheless, he would probably still have tried hydro- or aquaponics but does not believe that he would have ever gotten as far as he has now without the offered education. (Interview - Kurt, Appendix p.5).

7.2.3 Guerrilla Method

One way of integrating Urban agriculture into the municipality, would be to simply just plant seeds everywhere. Here the participants and I could use seed bombs, as proposed by TagTomat (Anders Laursen et al., 2016, p.38), and throw them in unsuspecting places where the seeds could bloom and grow and create food for the people. Hopefully, this would create some spaces where the municipality would not see the plants growing, and enabling the people living close by, to use the plants in dishes at home. Here we would propose harsher preferably native Danish plants, such as chives, mint, lemon balm and other plants from the same family, since they will be able to grow with no or little maintenance.

When the seedlings and plants are grown, and people see them and start using them, there will be the inevitable blessing and curse of social media. Here the posts about this on social media like the common Facebook group will come, and how people react on those will no one know at this point in time, I can see two paths happening.

First path, people will accept and appreciate the different plants around the neighborhood, they will find it nice to know that there is a mint nearby for when they need it for making a dish where they would otherwise need to buy it. Lastly, they will find it fun to go around the neighborhood trying to find other plants that they can use for dishes, cuttings, and whatever they will use them for.

The second path will be that people will be angry about it, since it changes their neighborhood, the plants are growing too close to vehicles and may therefore be toxic. They want this to stop and someone will write to the municipality who will investigate and remove the plants.

7.3 Three Possible ways of implementation Summary

When investigating the three implementation methods through MLP, we will see how the three ways of implementation acts. Here established institutions will need to interact with both the vacant land in the municipality of Vallensbæk, and the physical institutions such as schools, the local community center and buildings alike. (Figure 9)

The route of local events will need physical institutions like local companies to integrate them into their practices, and will mostly play along with the current lifelong learning practice, and thus creating a positive feedback loop that will enforce itself.

Guerrilla methods will use the vacant land just like through established institutions, but is in danger of current legislation in the municipality hitting hard against it, thus pushing the niche further away from the regime due to a bad reputation.

For our prototyping space, I will investigate “through local events” where I will create a small workshop where a selected number of people can try hydroponics, and I will use their feedback for further analysis of how such event could be created.

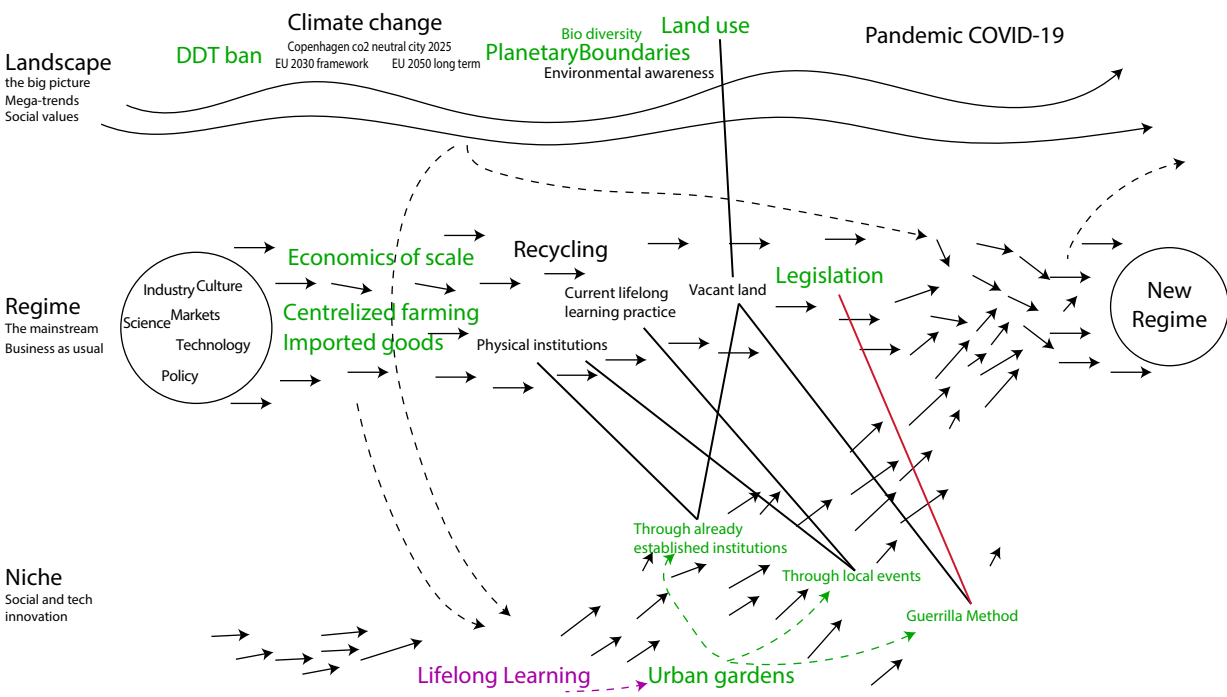


Figure 9 An illustration showcasing what actors the three different ways of implementation would leverage on, to become a part of the regime. Own Illustration, based on (Geels and Schot, 2007, p. 401)

7.4 Prototyping space

To investigate how the citizens in the municipality would react to an event driven by the municipality or by a local actor, I chose to create a prototyping space where I myself would act as if I were a facilitator of a workshop. To do this, I chose the subject of hydroponics, since this topic is both very relatable to urban gardening, but also strikes the perfect balance between people knowing how plants work, and a new knowledge of how to make products more effectively. For this prototype, I chose to focus on a small space called Amalieparken, supported by a local Facebook group, and where people live in apartments. This resulted in an “easy to work with” condition since the connections could easily be established, and since people in apartments are often more willing to try planting herbs and other types of produce if they can optimize it and get a greater harvest.

This prototyping space would given the conditions resemble a phenomenon called Zfarming or Zero-acreage farming where no land is used for the growing of crops. Thomaier proposes in their publication of Zfarming, some of the different implications of ZFarming, where this prototype is categorized as ZFarming for urban living quality, where the market is not in focus. The farming is instead focusing on other qualities such as urban living quality, educational or image. For Zfarming to become available in private homes there will often be a need for support from the landlord, financial aid and help to solve technical issues (Thomaier et al., 2014).

For this workshop I created a learning document since my focus for this Zfarming experiment is experimenting with the learning possibilities of local growing (Hydroponics learning document, Appendix p. 9-10).

The document describes how hydroponics works, where it is used and advantages/dis-advantages they could expect. This was done to create an overall learning objective for the participants, as well as creating a sense of relevance for them. Furthermore, I provided a guide for the setup and gave the participants a homemade starting kit with three assorted normal plants like salad, spinach, and other plants you would often find people growing. (Figure 10)

The intentions for this workshop was three-fold:

- Firstly I wanted to see if the assumptions of people wanting to grow their own food on their balcony was correct as found by my survey.
- Secondly, I wanted to see how people would react to new knowledge, how likely they would be to adopt it for future use in their life and spread the knowledge themselves.
- Third, to open up for a conversation about how they think new information and concepts should be available.

The result of my workshop was that compared to the feasibility survey, less people wanted to try this in the real world, this was however expected since the feasibility survey had a almost “too good to be true” result (Feasibility Survey, Appendix p. 4).

From this local Facebook group, around 3% of the members responded being willing to participate, here the engagement can be seen as a little above average compared to other post on the site. I will therefore conclude this percentage of people as a closer representation of reality than the survey, but with the survey still showing the interests of people. Here both the survey and my workshop was hosted through the use of Facebook, this has inevitably excluded some users, who are either not a part of that specific Facebook group, or simply do not use social media.

In relation to the learning objectives about hydroponics and the spread of knowledge, the people participating have all talked with family and friends about this new way of growing and showed me how new information is able to spread throughout the community.

A high-school kid from one of the participating families even took this a step further and implemented a small experiment based around hydroponics at her school. Two of the four participants have taken further actions in implementing hydroponics into their lifestyle, where one is now growing food for their pet guinea pigs, while another has bought a commercial “click and grow” set for their kitchen as a simple solution for fresh herbs.

From this I can see that if the topic is interesting, and is relevant to people, they will join in on the learning and spread the knowledge. Multiple users suggested other topics like how to promote a healthy lifestyle, how to do basic economics, how to clean your house sustainably.

When asked who the participants wanted to be the facilitator of events like this, it was of general consent that whoever the facilitator could be didn't really matter, as long as the event was well laid out, informative and the result being usable. It was however also noted that if the public sector was the overall facilitator of events, they could ensure a coherency between the events and also be the common meeting point where events would get posted and where you could sign up. Here the participants also noted that communication through the municipality newsletter or through the library Facebook page would be a great way for themselves to interact and share the events with their friend and other relevant people in their social circle.



Figure 10 This picture shows one of the hydroponic prototypes of the kratky method, that was given to the participants. Own picture

7.5 Prototyping space - cancelled

When I was seeking to conduct a prototyping space a worldwide pandemic hit us all and all activities were more or less closed down.

This worldwide pandemic did therefore also cancel the plans for one of the prototyping spaces that would kickstart the interaction between the municipalities, the schools and the citizens. The pandemic broke when an agreement between me as a researcher and the municipality was about to be agreed upon looking into land that could be used for this project.

I will therefore describe the further prototype as I planned it, and how it might be implemented in the future.

This prototype would be based on Ø-haven in Aarhus where a small space for people to grow would be created. I had along with the municipality found a space with vacant land that had no other use than being a grass field. The grass field is currently not in use, and is 100x200 meter big with a similar space next to it that would be ideal due to its currently not very attractive location next to the highway, while still nearby a residential area (Places to grow, Appendix p. 2) (Prototyping space (Cancelled), Appendix p. 3).

This means that people joining the project would have to travel under 500 meters as I through the survey found would be ideal, and the concept would also be only 300 meters away from a public school. Therefore, this prototype would be able to create the municipal, school and citizen interaction I was looking for. (Figure 12)

Another space that would be viable, is in Amalieparken, close by the public school Egholmskolen, here a total of 28.000 m² of usable space could theoretically be used, but more realistically, a hidden corner could provide a starting area for the project. Here the nearby area is mainly apartment buildings, where during the survey, I found that most people living in an apartment, would like some type of nearby garden accessible (Figure 11).

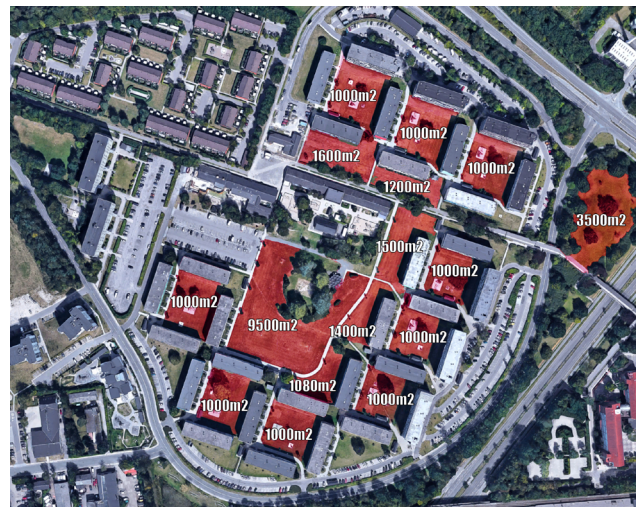


Figure 11 This picture illustrates the theoretical maximum of space used for Urban green gardens
Own illustration

In this space I would -as done in the executed prototype- integrate hydroponics as a new way of growing food and would have infographics explaining the growing cycle and the advantages and disadvantages of doing so. A later follow-up event would be created where people could try forces with hydroponics themselves as seen in the executed prototype.

With this prototyping space I would be able to create a community around gardening and knowledge related to this, and spread ideas such as hydroponics, Zfarming and other new concepts that are relevant for the participants.

To promote this, I would (as Ø-haven had done) create a flyer explaining the concept and the project location. If time, boxes with fresh herbs and lettuce like Ø-haven did would be favorable. All of this would have made it possible for the citizens to at first just apply for the event, and thereby also a raised urban gardening bed. At a later point, when the prototype would be finished and a smaller business could be started, I intended to start a subscription based service, where the citizens could rent or just sign up for a raised bed for a season (Feasibility Survey, Appendix p. 4).

The raised bed would be constructed of EU pallets, as those are common and a very donatable item and the soil within would need to be either purchased by the municipality, or donated by the local plant nursery – Plan-torama.

When the raised beds were created and the network would be somewhat stable, is when I as a researcher would have to stop since the time of my thesis would, based on ø-havernes experience, end. This means that within this timeframe, I would need to either hire or find people who could run the space. Here I have not currently found any possible actors other than private individuals managing this through the community center.



Figure 12 This picture Illustrates the proposed area for the implementation where a combined space of 13.750 m² goes unused, while still being located near a residential area.
Own Illustration

7.6 Proposed integration

If Vallensbæk municipality wants to integrate lifelong learning into their regime, green urban gardens will be a great starting point. Green urban gardens are as we have seen in our cases, being implemented around the world, and also inside of Denmark. Vallensbæk municipality could make a prototype themselves and thereby also control the whole process, or contact a company like 4H, who is a community garden association, and can therefore help with the integration of green urban gardens in Vallensbæk municipality.

The space I would propose for this would be located in the same space, as where I would have held my prototyping space. (Prototyping space (canceled), Appendix p.3) Since this area is municipality owned, relatively un-used, and located close to the highway, making the plot unfit for housing and other activities alike. The space would allow for up to 500 gardens on each plot of land, which should be more than enough for the local community. This space should include a communication platform, here I have through my prototype found that a usual Facebook group would fit nicely, where social events like common gardening, garden start-up, etc. and information about gardening and the space could be posted.

By creating this local urban garden, we promote the urban garden niche and try to incorporate it into our regime, still relying on the window of opportunity from climate change and the DDT ban.

After this green urban garden has become a part of the regime, I would change the focus of the events from being mostly social based, to become learning based where the local community center could become a part of this.

Here the community center should at the same time kick-start their learning courses and events, using the momentum of one or more events at the green urban garden, to adopt people into using the events and try to become a part of the regime this way.

7.6.1 School integration

When the gardening space had grown big and stable enough, the local public school (Pilehaveskolen) could use this space as an urban school garden, where kids from a young age could learn the physical aspects of growing plants, and create a better environment for the kids to learn biology in.

Here an educational course for kids throughout the school was created in collaboration with a teacher and the department manager at Egholmskolen, being another nearby school. I investigated the goals of learning throughout the years and found how an urban school garden could be integrated into the school system, and how the school children should interact with this, here I found that in 2nd 6th and 9th grade, you should interact with the gardens. (Borne- og Undervisningsministeriet, 2019a), (Borne- og Undervisningsministeriet, 2019b)

The first interaction, 2nd grade, would mainly involve planting plants, and see them grow, explaining how the sun, water and bees all play a part in the environment.

In the 6th grade, the focus would be to combine the subjects as well as build up the knowledge about growing plants. Here nutrients, pH value and other factors could be discussed with the kids, cooking, wood crafts and design, chemistry could all become related to growing the plants.

In 9th grade the students would change to a hydroponic system (here I recommend a system of the type nutrient film technique (NFT), where I would question what is actually needed for growing plants. I would combine this with cooking once again, and the newly developed course makerspace. Here I would focus on re-thinking the way we do common things, like growing plants, making foods and learn how I can change and adapt both our design and our cooking to get the most out of our situation. Here a makerspace course could help the kids making designing their own "click and grow" system with the use of 3D printing or laser cutting, grow food and ideally use this food in cooking, thus combining all the in a more integrated way. (Interview with District leader Appendix p. 6),(Interview with Teacher, Appendix p. 7)

7.7 Integration continued

If Vallensbæk municipality wants to integrate lifelong learning into their regime, green urban gardens will be a great starting point. Green urban gardens are, as I have illustrated in the earlier mentioned cases, being implemented around the world as well as in Denmark. Vallensbæk Municipality could make a prototype themselves and thereby also control the whole process, or contact a company like 4H, who is a community garden association, and can therefore help with the integration of green urban gardens in the Municipality of Vallensbæk.

The space I would propose for this would be located in the same space as where I would have held my prototyping space (Prototyping space (Canceled), Appendix p. 3), since this area is municipality owned, relatively un-used, and located close to the highway, making the plot unfit for housing and other activities. The space would allow for up to 500 gardens on each plot of land, which should be more than enough for the local community. This space should include a communication platform. I have through my prototype found that a usual Facebook group would fit nicely, where social events like common gardening, garden start-up, etc. and information about gardening and the space could be posted (Feedback from prototype, Appendix p. 8).

By creating this local urban garden, we promote the urban garden niche and try to incorporate it into our regime, still relying on the window of opportunity from climate change and the DDT ban.

After this green urban garden has become a part of the regime, I would change the focus of the events from being mostly social based, to become learning based where the local community center could become a part of this.

Here, the community center should at the same time kick-start their learning courses and events, using the momentum of one or more events at the green urban garden, to adopt people into using the events and try to become a part of the regime this way.

8. Discussion

Other ways of implementation

As stated in the start of this paper, I have only focused on lifelong learning in respect to Green urban farming. As a result of this I have neglected all the other ways one could implement lifelong learning in a municipality. That raises the question if green urban gardening is the best way of doing this?

To this, I will say that no, it might not be. As I have explored, Lyngby has focused on their theme “vidensby” which also seems to be a very powerful way to increase local knowledge and lifelong learning. An urban garden is, unlike events, better at creating knowledge in this specific area. This is also seen as the case in Valby, where Copenhagen makerspace is located. People nearby can specialize in 3D modelling and production, where people local urban gardens can specialize in growing food and plant species. Events will probably provide a bigger range of knowledge, but this knowledge will neither be specialized nor tacit.

Is creating a space meant to not only growing food, but also change social culture a good thing?

When creating a space such as a one for social learning events, I would argue that a more educated and wiser population is more resilient to changes such as what happened during COVID-19. Having a better educated population gives the citizens a better knowledge basis where they can grasp theories, often leading to a happier, safer and more satisfied population. (ramsthaler@un.org, 2014)

Can the translation of knowledge be harmful?

Providing a learning culture in the form of events can be harmful if the information being spread is not selected correctly. If one actor spreads misinformation about a given topic or exaggerate on a topic he/she will be able to damage local companies. It is therefore vital for educational events to be carefully chosen, with actors that, while still promoting their business, will not make people biased against competitors.

We are currently living in a period of time where information is widely available, and as a result of this, we have to question everything we read and understand where it comes from, who wrote it and why they wrote it (Hitchcock, 2018). As an example worth mentioning is the “FYRE festival”, a festival being promoted heavily on social media, which turned out to be a made up festival, costing investors and guests \$26 million (Hanbury, 2019).

This would probably not happen in the same scale as FYRE festival if a company spread false information, but the ability to talk face to face with a group of people by an event hosted by the municipality does pose a risk.

Who will join in? And how do we get people to join?

When creating a public event, one major question is: who will join the events?

In this project the question is addressing the different population groups living in Vallensbæk, since there, as in so many other municipalities, are many different types of people. Here one of the main concerns is that only the educated population might show up, since they might be the ones who already know how valuable lifelong education is. They might also be the only ones having spare time, since most well educated people are working 8-16 jobs with good job security and who are flexible, while the lower educated people might be working jobs around the clock, and might therefore neither have the time nor the energy to go to a random event held by the municipality.

This would result in the learning events completely missing the whole point of lifelong Learning, where everybody in the municipality should gain knowledge throughout their life. However, just because you can, does not mean that you will. I will therefore have to make sure that not only the already educated people joined in on the learning courses. Using a physical media as learning in the schools

When teaching school children, it is often said that kids learn better through play as well as through physical interaction with things. (Misirlisoy, 2019) It is therefore often suggested from the teachers, that physical objects are included in the learning. An example is “Ozobot”, a small robot that you are able to program by using colours, aimed to learn the basic idea of coding to kids from 0-4th grade. In the same realm, school gardens are often suggested for subjects like biology, and nature & technology. By creating a physical object like an urban garden, rather than simply a presentation event, kids might be more accepting of the knowledge being presented to them, and it will become closer

to a game, than a lecture. I would therefore state that creating physical objects for learning can be an important part of our future city, where we provide learning for everybody.

How likely is this to be a bigger part of the future?

When I look back at projects I have done in the past, where I helped to implement retaining living walls, meaning plants growing in a vertical manner rather than horizontal. We saw a huge market for those inside the cities in many different shapes and sizes, we worked with a Danish supplier of hot water and sewage management. Here we helped designing a wall for one of their cooling stations with great success from both HOFOR, being the company, but also the local community where we would change the path of what was first a fight between the citizens living nearby, and HOFOR. To what could become a relationship where HOFOR’s cooling station could provide more into the local area than just cooling, but could be also a green symbol and a space for people to use their leisure time, or learn about plants and biodiversity.

Is lifelong learning already a part of the regime?

Lifelong learning is big part of our Danish culture, where we through work often have opportunities to further educate ourselves. IDA and Vidensbyen Lyngby as explored in this paper are also institutions that provide learning for the everyday people. Those are all a stable part of our regime. The ideology of learning is however not often designed for, and this can provide a risk in a future where many will need to re-educate themselves for finding new jobs. This proposed integration of a urban living wall will however not re-educate people, but will provide a space for a learning network to be built, through which the citizens can obtain more information or get to explore new concepts they might not even know existed.

9. Conclusion

To promote and maintain the culture of lifelong learning in our future cities, we have to change our design of the city. This change can happen in many different ways such as implementing learning events through a local community center, or by implementing green urban gardens. As shown in this study, the learning activity does, however, have to be related to interests of the local area, and should give the participants a result that they can work with whether that being tangible things like fruit and vegetables or usable knowledge of a new way of cleaning your house in a more sustainable way. If the knowledge presented is interesting, people will participate in the act of learning.

When looking at Vallensbæk, I can see the huge potential this municipality has for implementing lifelong learning throughout their city. They have vacant municipality owned land that are currently just a grass field, they have schools who are ready to engage with school gardens, and they have a community center that can host events with the local business. Vallensbæk is currently one of the municipalities who uses the most amount of their wealth on education, why lifelong learning throughout the municipality could be a great addition to both learning for the children, but also for the adults.

I have throughout this paper used green urban gardens to promote the idea of lifelong learning, and I have seen both from the cases and from my prototyping space that growing your own plants is attractive for some families. When being challenged with a new way of growing things, and thus new knowledge, the challenge becomes an interesting task to overcome, where you will need to learn how the system works in order to achieve a result - in this case, easy and fast growing plants.

I have proposed one way the municipality of Vallensbæk could incorporate lifelong learning into the regime through an urban garden by creating a network between the school, the community center, and the green urban garden. This will give people the incentive and opportunity to develop and maintain their knowledge throughout their life.

10. Reflection

Throughout this project, I have truly learned to expect the unexpected. The first part of my project was located in Copenhagen regrading the integration of greenery into the city, and investigating the contributions of this to the local area. However, at some point during the process my partner stopped responding, leaving me stranded with knowledge, but nowhere to implement it. This led me looking for other urban spaces both inside of Copenhagen and outside Copenhagen till I found Vallensbæk, where they are currently implementing some smart technology in their city with goals matching those of lifelong learning. The municipality was going to start their studies of what a smart city can do, and how they should implement it after the summer, but they were interested enough to have meetings with me discussing what green urban spaces might be able to do for the city, and they were willing to implement a small prototype. After conversations about how this should be done and where, the COVID-19 pandemic hit the world, and the municipality and all development in regards to anything else than the pandemic got put on hold from then till an unknown date, and is in the current state of writing starting to open the municipality slowly up once again.

When working with a municipality, it is important to know who the sponsor(s) for the project is, and in my case it's been the municipality themselves - but it could just as well have been a private investor. When working with sponsors and investors, it is important to keep the connection up and running, so your primary stakeholder is aware of what is currently happening and the momentum of the project is maintained. In this case, if the prototype had been held, I would have needed to create a local Facebook group and/or emailing list with events that would keep people coming back to the space, working together and see other people there. In the same manner, it would be wise to invite sponsors and investor to give them a visible confirmation that this project is still operating, and that they therefore should continue their investments.

The elephant in the room when implementing lifelong learnings, is the measurability of it, since lifelong learning is, as the name implies, lifelong. Any timeframe that is 20 or even 30 years in the future are problematic to implement if there is no measurable difference within 4 years until next election is happening, and the party in power, might be replaced by another party, who might not share the same beliefs of lifelong learning. Here we might see a space like Ø-haven being a more viable solution than events, since their adaptation into the niche made their service irreplaceable and here any political party having power would be wise enough to keep in place, what the public are asking for.

11. References

11.1 Literature

Adams, B. (2019). In Detroit, A New Type of Agricultural Neighborhood Has Emerged. [online] Yes! Magazine. Available at: <https://www.yesmagazine.org/social-justice/2019/11/05/food-community-detroit-garden-agriculture/> [Accessed 30 May 2020].

Anders Laursen, Mads Boserup Lauritsen, Rikke Pape Thomsen, Tor Nørretranders and Ramastudio (2016). TagTomat : vejen til grønne fællesskaber i byen. Kbh.: Ctrl+Alt+Delete Books, p.38.

Anh Dang, Q., Khatr, S., Hart, N. and Tran, T. (2010). Vietnam Forum Lifelong Learning Building a Learning Society Proceedings.

Archer, J. (2018). Robots will create millions more jobs than they displace, claims WEF. [online] The Telegraph. Available at: <https://www.telegraph.co.uk/technology/2018/09/17/robots-will-create-millions-jobs-displace-claims-wef/> [Accessed 30 May 2020].

Borne- og Undervisningsministeriet (2019a). Biologi Fælles Mål. [online] Available at: <https://emu.dk/sites/default/files/2019-08/GSK-F%C3%A6lles%20M%C3%A5l-Biologi.pdf> [Accessed 30 May 2020].

Borne- og Undervisningsministeriet (2019b). Natur/teknologi Fælles Mål. [online] Available at: <https://emu.dk/sites/default/files/2019-08/GSK%20-%20F%C3%A6lles%20M%C3%A5l%20-%20Natur%20teknologi.pdf> [Accessed 30 May 2020].

Bull Nyvang, L. (2014). Aarhus Ø-have skal skabe havneliv. [online] jyllands-posten.dk. Available at: <https://jyllands-posten.dk/aarhus/politik/ECE6721099/aarhus-oehave-skal-skabe-havneliv/> [Accessed 30 May 2020].

Callon, M. (1984). Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St Brieuc Bay. The Sociological Review, [online] 32(1_suppl), pp.196–233. Available at: <http://www.thetransformationproject.co.uk/wp-content/uploads/Actor-Network-Theory.pdf> [Accessed 6 Dec. 2019].

Carlet, F., Schilling, J. and Heckert, M. (2017). Greening U.S. legacy cities: urban agriculture as a strategy for reclaiming vacant land. Agroecology and Sustainable Food Systems, 41(8), pp.887–906.

Carlile, P.R. (2002). A Pragmatic View of Knowledge and Boundaries: Boundary Objects in New Product Development. Organization Science, 13(4), pp.442–455.

Cherry, K. (2014). Confirmation Bias. [online] Verywell Mind. Available at: <https://www.verywellmind.com/what-is-a-confirmation-bias-2795024> [Accessed 3 Jun. 2020].

COK (2017). Vallensbæk: Smart City. [online] Available at: <https://www.slideshare.net/cokslides/vallensbk-smart-city> [Accessed 30 May 2020].

coopmedlem. (n.d.). Scan & Betal med Coop app'en. [online] Available at: <https://www.coopmedlem.dk/scanogbetal> [Accessed 30 May 2020].

Corporate Finance Institute. (2018). The Importance of Lifelong Learning - Improve your Quality of Life. [online] Available at: <https://corporatefinanceinstitute.com/resources/elearning/the-importance-of-lifelong-learning/>.

Crouch, A. (2015). Guerrilla Gardener Sparks Food Revolution in South Central LA. [online] NBC Los

Angeles. Available at: <https://www.nbclosangeles.com/news/guerrilla-gardener-sparks-food-revolution-in-south-central-la/116418/> [Accessed 30 May 2020].

Danmarks Statistik (2019). Statistikbanken. [online] Statistikbanken.dk. Available at: <https://statistikbanken.dk/statbank5a/default.asp?w=768> [Accessed 30 May 2020].

Davison, D. (2018). How urban agriculture is transforming Detroit | Devita Davison. TED. Available at: <https://www.youtube.com/watch?v=G88JZ1DIdg8> [Accessed 30 May 2020].

DesignCouncil. (2019). What is the framework for innovation? Design Council's evolved Double Diamond. [online] Available at: <https://www.designcouncil.org.uk/news-opinion/what-framework-innovation-design-councils-evolved-double-diamond> [Accessed 30 May 2020].

Dilling, S. (2016). Danske tomater co2-belaster 11 gange mere end spanske. [online] Politiken. Available at: <https://politiken.dk/forbrugogliv/forbrug/tjekmad/art5620069/Danske-tomater-co2-belaster-11-gange-mere-end-spanske> [Accessed 30 May 2020].

Dirks, S., Gurdgiev, C. and Keeling, M. (2010). IBM Global Business Services Executive Report Smarter cities for smarter growth How cities can optimize their systems for the talent-based economy Government. [online] IBM. Available at: <https://www.ibm.com/downloads/cas/8NEWPLZ1> [Accessed 30 May 2020].

Education at a glance 2014. (2014). .

El Bilali, H. (2019). The Multi-Level Perspective in Research on Sustainability Transitions in Agriculture and Food Systems: A Systematic Review. Agriculture, 9(4), p.74.

Finley, R. (2013). A guerilla gardener in South Central LA | Ron Finley. TED. Available at: https://www.youtube.com/watch?v=EzZzZ_qpZ4w.

Frank, M., Cebrian, M., Youn, H., Sun, L. and Rahwan, I. (2018). How Will Automation Affect Different U.S. Cities? [online] Kellogg Insight. Available at: <https://insight.kellogg.northwestern.edu/article/how-will-automation-affect-different-united-states-cities> [Accessed 30 May 2020].

Geels, F.W. (2005). The dynamics of transitions in socio-technical systems: A multi-level analysis of the transition pathway from horse-drawn carriages to automobiles (1860–1930). Technology Analysis & Strategic Management, 17(4), pp.445–476.

Geels, F.W. and Schot, J. (2007). Typology of sociotechnical transition pathways. Research Policy, 36(3), pp.399–417.

Gro Spiseri. (n.d.). Our Food. [online] Available at: <https://www.grospiseri.dk/concept> [Accessed 30 May 2020].

Hanbury, M. (2019). These photos reveal why the 27-year-old organizer of the disastrous Fyre Festival has been sentenced to 6 years in prison. [online] Business Insider. Available at: <https://www.businessinsider.com/fyre-festival-expectations-vs-reality-2017-4?r=US&IR=T#they-were-told-they-would-fly-in-from-miami-on-a-custom-vip-configured-boeing-737-7> [Accessed 3 Jun. 2020].

Hitchcock, D. (2018). Critical Thinking (Stanford Encyclopedia of Philosophy). [online] Stanford.edu. Available at: <https://plato.stanford.edu/entries/critical-thinking/> [Accessed 3 Jun. 2020].

ida.dk. (n.d.). Arrangementer og kurser - se hele oversigten her. [online] Available at: <https://ida.dk/arrangementer-og-kurser> [Accessed 30 May 2020].

Jan Reitz Jørgensen and Danmark. Undervisningsministeriet. Afdelingen For Erhvervsrettet Vok-

senuddannelse (2007). Danmarks strategi for livslang læring : uddannelse og livslang opkvalificering for alle. Kbh.: Undervisningsministeriet, Afdelingen For Erhvervsrettet Virksomhed ; [Haslev.

Kend din kommune – Brug nøgletal i styringen 2019. (2019). [online] Kommuneforlaget A/S. Available at: <https://www.kl.dk/media/18090/kend-din-kommune-2019.pdf> [Accessed 2 Jun. 2020].

kmdvalg.dk. (2019). KMDValg. [online] Available at: <https://www.kmdvalg.dk> [Accessed 30 May 2020].

Kolko, J. (2012). Wicked problems: problems worth solving : a handbook & a call to action. Austin, Texas: Ac4d.

Lesley, A. (2012). Survey Research Design – Then and Now. Designing & Doing Survey Research, pp.1–13.

London, M. (2011). Lifelong Learning: Introduction. [online] Oxford Handbooks Online. Oxford University Press. Available at: [https://www.oxfordhandbooks.com/view/10.1093/oxfordhb-9780195390483.001.0001/oxfordhb-9780195390483-e-001](https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780195390483.001.0001/oxfordhb-9780195390483-e-001).

Lui, E. (2019). Transforming Food Deserts: A Food Justice Tour of South Los Angeles - The California Wellness Foundation. [online] The California Wellness Foundation. Available at: <https://www.calwellness.org/stories/transforming-food-deserts-a-food-justice-tour-of-south-los-angeles/>.

Managementstudyguide.com. (2015). Desk Research - Methodology and Techniques. [online] Available at: <https://www.managementstudyguide.com/desk-research.htm> [Accessed 30 May 2020].

manager (2016). Denmark has the 3rd. best Higher Education System in the World. [online] Studyindenmark.dk. Available at: <https://studyindenmark.dk/news/denmark-has-the-third-best-higher-education-system-in-the-world> [Accessed 30 May 2020].

McDougall, R., Kristiansen, P. and Rader, R. (2019). Small-scale urban agriculture results in high yields but requires judicious management of inputs to achieve sustainability. Proceedings of the National Academy of Sciences, [online] 116(1), pp.129–134. Available at: <https://www.pnas.org/content/116/1/129> [Accessed 18 Mar. 2020].

Medium. (2017). “Knowledge is the most valuable thing we have to give.” [online] Available at: <https://medium.com/@creativecommons/knowledge-is-the-most-valuable-thing-we-have-to-give-abc-c90c29778> [Accessed 30 May 2020].

Meek, T. (2019). Effects of Deforestation: How Does Agriculture Cause Deforestation? [online] Sentientmedia.org. Available at: <https://sentientmedia.org/how-does-agriculture-cause-deforestation/> [Accessed 1 Jun. 2020].

Misirlisoy, E. (2019). How Physical Experiences Improve Our Ability to Learn. [online] Medium. Available at: <https://medium.com/swlh/how-physical-experiences-improve-our-ability-to-learn-e952e-b87766e> [Accessed 2 Jun. 2020].

Neighbors Building Brightmoor. (n.d.). About. [online] Available at: <http://www.neighborsbuilding-brightmoor.org/about.html> [Accessed 30 May 2020].

Oecdbetterlifeindex.org. (2016). OECD Better Life Index. [online] Available at: <http://www.oecdbetterlifeindex.org/countries/denmark/> [Accessed 30 May 2020].

Ø-haven. (n.d.). Ø-Haven | Urban Byttehave på Aarhus Ø. [online] Available at: <https://oehaven.dk/> [Accessed 30 May 2020].

Pedersen, S. (2016). Navigating Prototyping Spaces.

Politi. (2020). Nye tiltag mod covid-19. [online] Available at: <https://politi.dk/coronavirus-i-danmark/seneste-nyt-fra-myndighederne/nye-tiltag-mod-covid-19>.

Poulsen, R. (2020). Interview with Teacher.

Quora.com. (2014). What caused the decline of Detroit? [online] Available at: <https://www.quora.com/What-caused-the-decline-of-Detroit> [Accessed 3 Jun. 2020].

ramsthaler@un.org (2014). Higher Education. [online] academicimpact.un.org. Available at: <https://academicimpact.un.org/content/higher-education> [Accessed 3 Jun. 2020].

Rhinow, H., Köppen, E. and Meinel, C. (2012). Prototypes as Boundary Objects in Innovation Processes.

Risgaard, L. (2019). Fagboss: Sådan skaber vi et rigere Danmark. [online] FINANS. Available at: <https://finans.dk/debat/ECE11295623/saadan-skaber-vi-et-rigere-danmark/> [Accessed 30 May 2020].

Ritchie, H. and Roser, M. (2019). Land Use. [online] Our World in Data. Available at: <https://ourworldindata.org/land-use> [Accessed 3 Jun. 2020].

Schneewies, C., Nissen, A., Nørgaard, K. and Winther, C. (2019). Urban Biodiversity Through Living Walls.

Simon, M. (2019). Inside the Amazon Warehouse Where Humans and Machines Become One. [online] WIRED. Available at: <https://www.wired.com/story/amazon-warehouse-robots/> [Accessed 30 May 2020].

Smartcitiesdive (n.d.). Detroit’s Urban Agriculture Ordinance Inspires Changes to Vacant Lots | Smart Cities Dive. [online] www.smartcitiesdive.com. Available at: <https://www.smartcitiesdive.com/ex/sustainablecitiescollective/detroit-s-urban-agriculture-ordinance-inspires-changes-vacant-lots/173941/> [Accessed 30 May 2020].

Smith, P.J., Sadler-Smith, E., Robertson, I. and Wakefield, L. (2007). Leadership and learning: facilitating self-directed learning in enterprises. Journal of European Industrial Training, 31(5), pp.324–335.

Spectral Engines (2018). Industry 4.0 and how smart sensors make the difference. [online] www.spectralengines.com. Available at: <https://www.spectralengines.com/articles/industry-4-0-and-how-smart-sensors-make-the-difference> [Accessed 30 May 2020].

State of Michigan (n.d.). Interactive District Map. [online] City of Detroit. Available at: <https://detroitmi.gov/webapp/interactive-district-map> [Accessed 30 May 2020].

Stockholmresilience.org. (2012). Planetary boundaries - Stockholm Resilience Centre. [online] Available at: <https://www.stockholmresilience.org/research/planetary-boundaries.html>.

Thomaier, S., Specht, K., Henckel, D., Dierich, A., Siebert, R., Freisinger, U.B. and Sawicka, M. (2014). Farming in and on urban buildings: Present practice and specific novelties of Zero-Acreage Farming (ZFarming). Renewable Agriculture and Food Systems, 30(1), pp.43–54.

uil.unesco.org. (2015). UNESCO Global Network of Learning Cities | UIL. [online] Available at: <https://uil.unesco.org/lifelong-learning/learning-cities> [Accessed 30 May 2020].

uil.unesco.org. (2019). Learning cities: Drivers of inclusion and sustainability | UIL. [online] Available at: <https://uil.unesco.org/lifelong-learning/learning-cities/learning-cities-drivers-inclusion-and-sustainability> [Accessed 30 May 2020].

UNESCO (2014). Key Features of Learning Cities.

US Centus (2017). Map Data. [online] Census.gov. Available at: https://www2.census.gov/geo/docs/maps-data/data/gazetteer/2017_Gazetteer/2017_gaz_place_26.txt [Accessed 30 May 2020].

US Centus (2019). Population and Housing Unit Estimates Tables. [online] The United States Census Bureau. Available at: <https://www.census.gov/programs-surveys/popest/data/tables.2019.html> [Accessed 30 May 2020].

US EPA (2018). DDT - A Brief History and Status | US EPA. [online] US EPA. Available at: <https://www.epa.gov/ingredients-used-pesticide-products/ddt-brief-history-and-status> [Accessed 30 May 2020].

UVM. (2007). Foreword. [online] Available at: <http://static.uvm.dk/publikationer/2007/lifelonglearning/kap00.html> [Accessed 30 May 2020].

Vallensbæk Kommune. (2019). Vallensbæk fremhæves i Dansk Industri-undersøgelse. [online] Available at: <https://www.vallensbaek.dk/nyheder/kommunen/vallensbaek-fremhaeves-i-dansk-industri-undersogelse> [Accessed 30 May 2020].

Vallensbæk Kommune. (n.d.). Aktiviteter. [online] Available at: <https://www.vallensbaek.dk/aktiviteter> [Accessed 30 May 2020].

Vidensby. (n.d.). Home. [online] Available at: <https://vidensby.dk/en/home/> [Accessed 1 Jun. 2020].

Weinberg, K. (2020). Aeroponics course and creating a community in the US. 28 Apr.

Wolf, K. (2010). Mental Health :: Green Cities: Good Health. [online] Washington.edu. Available at: https://depts.washington.edu/hhwb/Thm_Mental.html [Accessed 30 May 2020].

WUR. (2018). Urban tiny forests are good for biodiversity. [online] Available at: <https://www.wur.nl/en/newsarticle/Urban-tiny-forests-are-good-for-biodiversity.htm> [Accessed 30 May 2020].

www.facebook.com. (n.d.). Ø-Haven. [online] Available at: <https://www.facebook.com/oehaven> [Accessed 3 Jun. 2020].

www.kenddinkommune.dk. (2017). Vallensbæk Kommune - Kend din kommune. [online] Available at: <http://www.kenddinkommune.dk/boble.php?kid=187#/~/budgetteret-i-alt-br---vallensb-k-kommune> [Accessed 30 May 2020].

www.oecd.org. (2001). Cities and Regions in the New Learning Economy - OECD. [online] Available at: <http://www.oecd.org/internet/citiesandregionsinthenewlearningeconomy.htm> [Accessed 30 May 2020].

www.statistikbanken.dk. (n.d.). Statistikbanken. [online] Available at: <https://www.statistikbanken.dk/BY1> [Accessed 30 May 2020].

www.uvm.dk. (2020). Den åbne skole. [online] Available at: <https://www.uvm.dk/folkeskolen/laering-og-laeringsmiljoe/den-aabne-skole>.

Yarnit, M. (2015). Whatever Became of the Learning City? Journal of Adult and Continuing Education, 21(2), pp.24–35.

11.2 Illustrations

Crouch, A. (2015). Guerrilla Gardener Sparks Food Revolution in South Central LA. Available at: <https://www.nbclosangeles.com/news/guerrilla-gardener-sparks-food-revolution-in-south-central-la/116418/> [Accessed 4 Jun. 2020].

Geels, F.W. and Schot, J. (2007). Typology of sociotechnical transition pathways. Research Policy, 36(3), p.401.

Oe-haven (2014). Coverbillede. Available at: <https://www.facebook.com/oehaven>.

Pedersen, S. (2016). Navigation. Available at: https://vbn.aau.dk/ws/portalfiles/portal/316427882/PHD_Signe_Pedersen_E_pdf.pdf.

Vallensbæk Kommune (2017). Kommunekort. Available at: <https://www.vallensbaek.dk/kommunen-medarbejder-i-vallensbaek-kommune/vallensbaek-kommune/kort-over-vallensbaek> [Accessed 4 Jun. 2020].

Wicked Problem. (2018). medium.com. Available at: <https://medium.com/lakeer/wicked-problems-and-building-teams-who-solve-them-3eeca1222f4> [Accessed 4 Jun. 2020].

Overview of appendix

Page 1	Wordlist
Page 2	Places to grow
Page 3	Prototyping space (canceled)
Page 4	Feasibility Survey
Page 5	Interview - Kurt
Page 6	Interview - District leader
Page 7	Interview – Teacher
Page 8	Feedback from prototypes
Page 9	Hydroponic learning document P. 1+2
Page 10	Hydroponic learning document P. 3+4
Page 11	School gardens in Egholmskole P. 1+2
Page 12	School gardens in Egholmskole P. 3+4
Page 13	School gardens in Egholmskole P. 5+6
Page 14	School gardens in Egholmskole P. 7

Wordlist

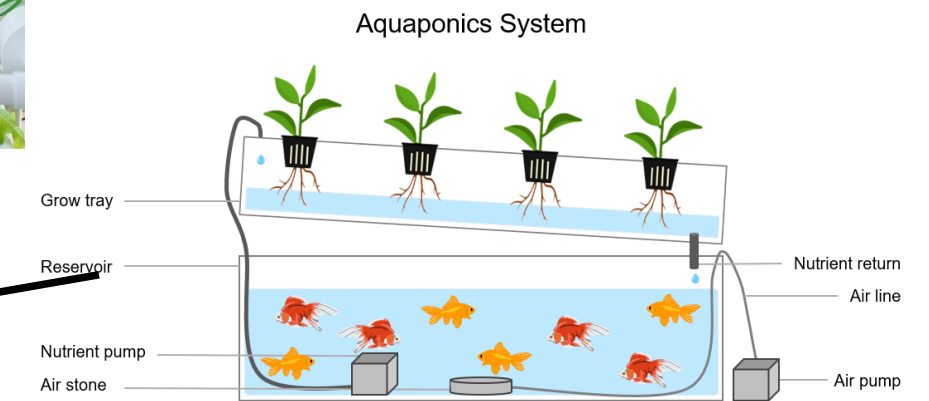
Hydroponics

Hydroponics is generally a description for the growing of plants without the use of soil, but in a nutrient solution instead. There are many different types of hydroponics, Kratky being the practiced method in this study. Kratky is known as the easiest method of hydroponicing with a bucket filled with water and nutrients (Nutrient Film Technique, NFT) where a pump creates a small river across the roots of the plants.



Aquaponics

Aquaponics are generally much much alike hydroponics, however the nutrients are created from fish. The techniques for building the systems are however much similar to hydroponics.



Makerspace

Makerspace is a place where you can create things, often equipped with modern technology like 3D printing, laser cutting, electronics, coding, and other similar things, making a space for the creation of things and ideas.



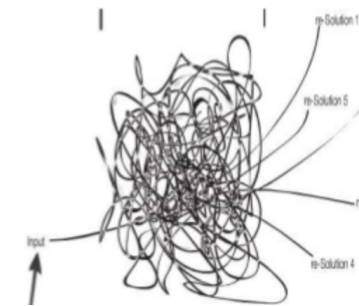
Agrihood

Agrihood is an abbreviation of agricultural neighborhood, meaning a neighborhood that is integrating farms and gardens and thereby allowing the citizens to supply themselves with food instead of relying on supermarkets.



Wicked problems

Wicked problems are describing problems with no easy or binary solution. Here, a solution can be described only as something better or worse than the starting point.



TED-talk

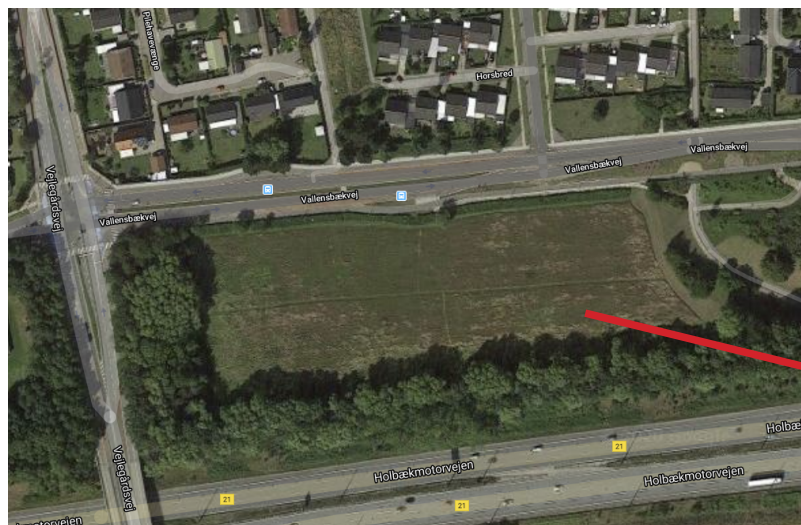
Ted talks is a conference company that posts online for free distribution under the slogan "ideas worth spreading".



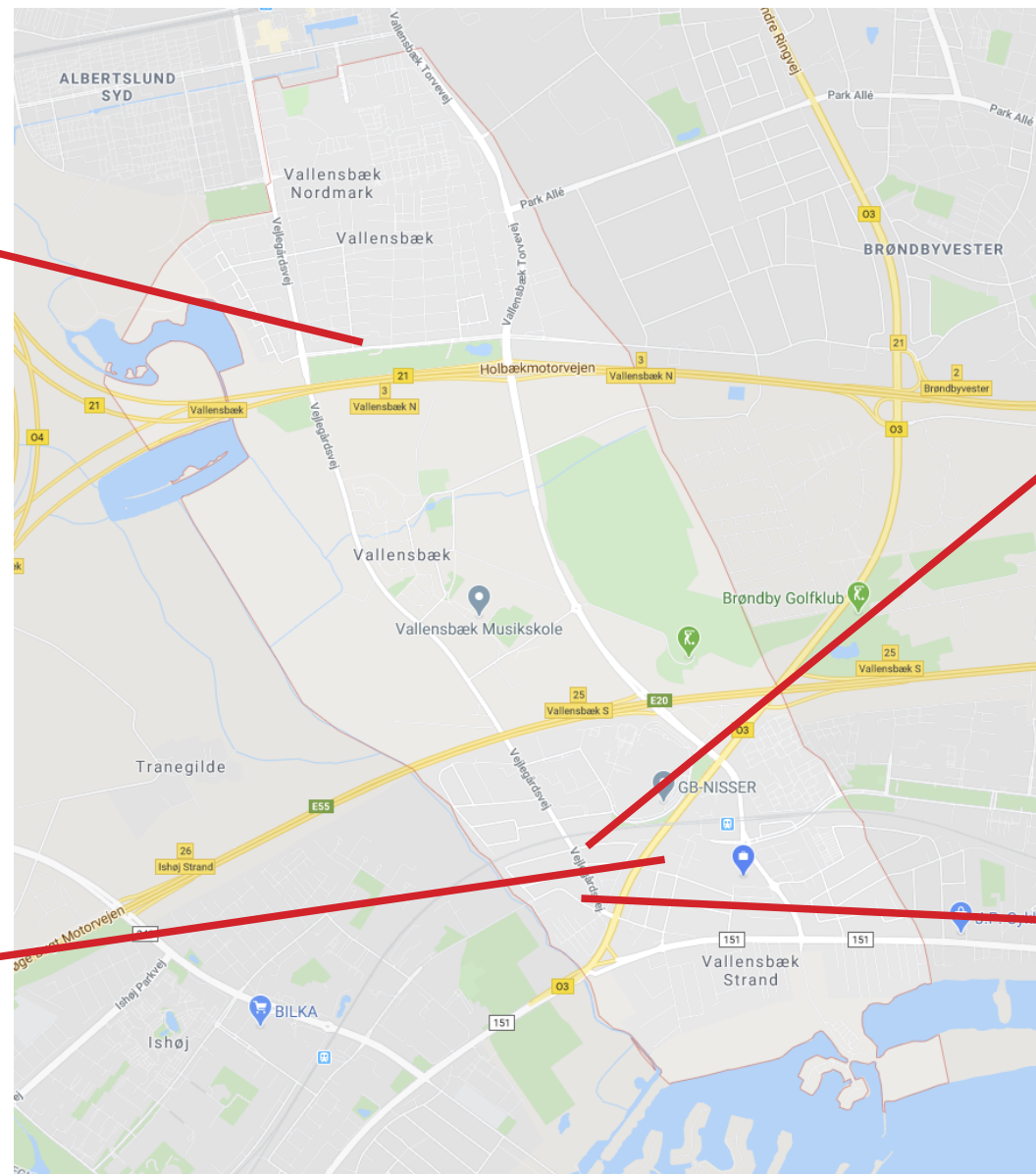
Z-farming

Z-farming also known as Zero-farming is describing a farming method that requires zero use of land, here vertical farming in an apartment, or on the side of the house could be examples since they don't take up any useable space

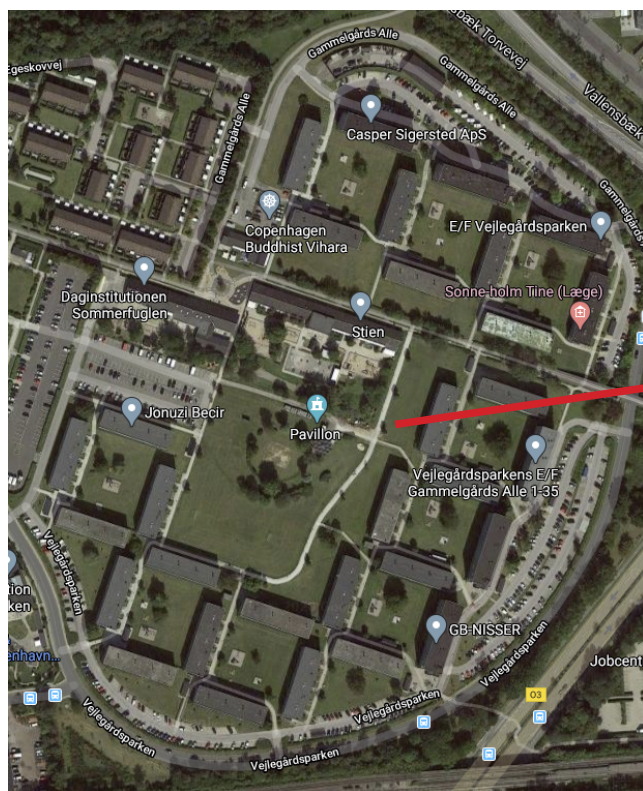
Possible places to grow Vallensbæk



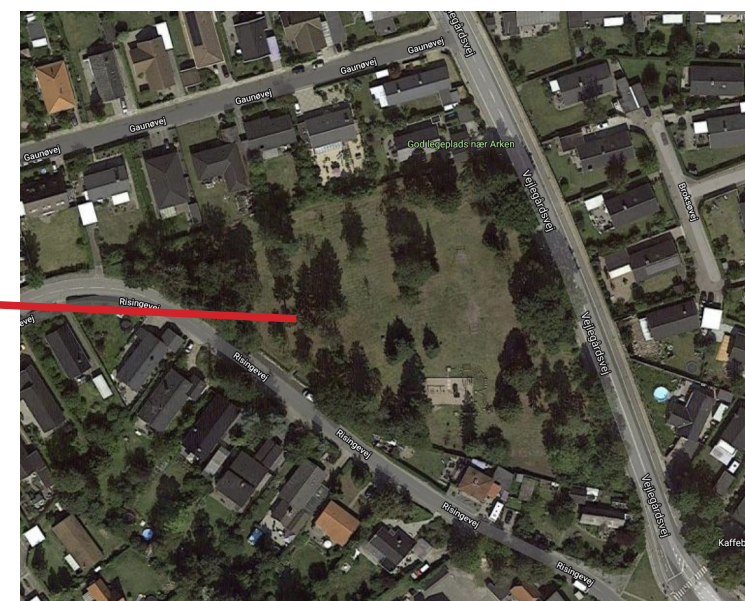
Vallensbæk vej 80



Vejlegårdsvej 28



Vejlegårdsparken 12



Vejlegårdsvej 17

Prototyping space (canceled)

Location: 55.642847, 12.360221



Proposed space: 27 gardens for prototyping purposes



This type of raised bed is easily movable with a lifter, and can therefore be moved around as needed. For a small raised bed (pictured in prototype) is only one pallet needed for the creation, while 5 is needed for a big one.



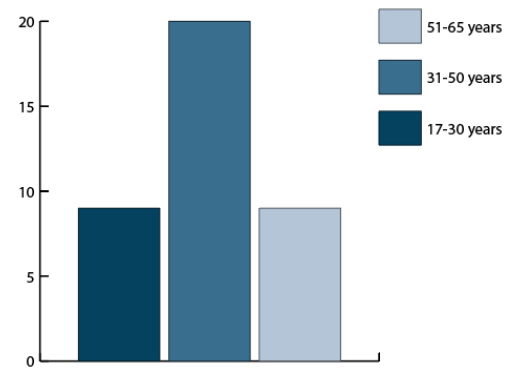
Theoretical Maximum: ~500 (491 pictured) gardens



Feasibility Survey

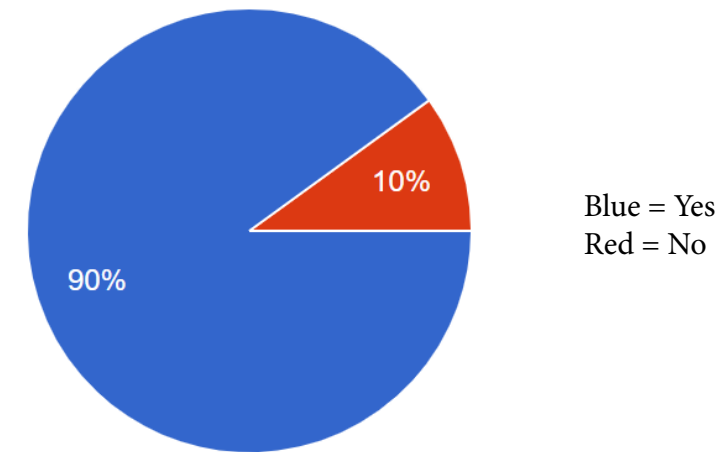
42 answers

Age



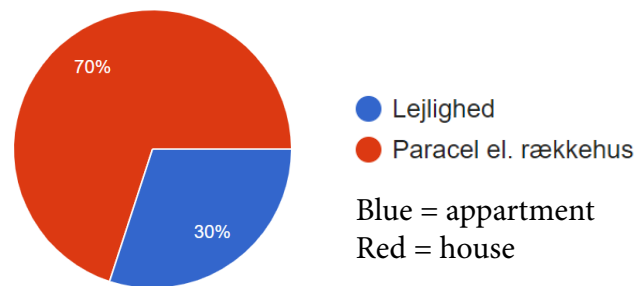
Under 17, and over 66 years has been cut, due to no answers in the survey

Would you like there to be learning material present? (like with animals in zoo)



Blue = Yes
Red = No

Appartment or house?

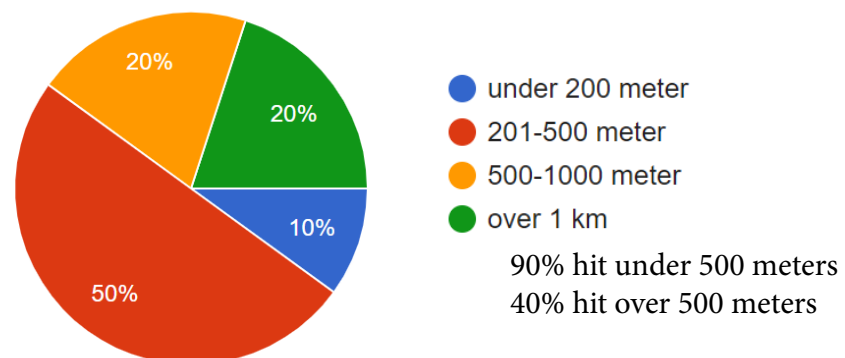


Blue = appartment
Red = house

How should you get a planting case?

- 10 waiting list
- 26 pay a small price
- 6 pay, but there is service (gardners)

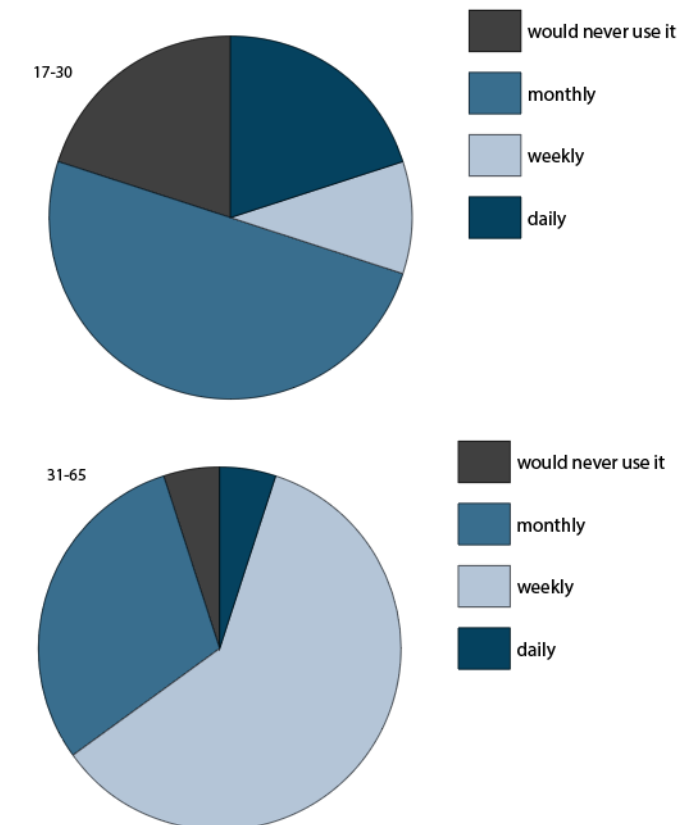
Maximum distance



90% hit under 500 meters
40% hit over 500 meters

If the garden was close, how much would i use it myself?

(age split up for clarifcation purposes)



Total:

17 monthly
16 weekly
4 daily
5 never

Survey adress <https://forms.gle/PDzyDWi3kEs352cRA>

Interview - Kurt

Who: Kurt Weinberg **Date:** 2020-04-28 **Was the interview Recorded?** Yes **How was it conducted:** Over microsoft teams

Why: He was part of a Aquaponics workshop made by an university

Key points from interview

5:50 The local university had a course and are often making small events, they did a presentation at my wifes work

6:30 i have 10 acres (40.000m2) in the high desert, always wanted the land to work for me, and local farming is not possible due to the water use. making hydro/aquaponics very intersting

9:10 i set up a system with salantro and basil, and i got the whole aqarium from the facebook market place, i dont have any fish yet due to the covid case.

12:10 i'm winding down my job and are only part time currently, and this can be done on the side and be done when i get older

13:20 the facebook groups that were put up haven't been active due to the corona virus

13:50 If you live ourside the big cities, and where there are no farms nearby, your only option is the dollar store, and that is frozen foods... basically s**t

18:30 it's something diffrent to do from getting in the office every day!

19:30 saw something about it in my facebook feed, you know how that is, but without the college i would not have gotten this far at all!

20.30 they ceated this facebook group for keeping in contact, sharing ideas and just networking in general, the professors were also open for questions in there and they were really pushing the idea! and the course were free!

21:20 Local production will for sure be a bigger part of sociaty in the future. especially in places like here where it's hard to grow, the popularity of growing your own food is really taking off.

22:40 Nothing beats a home or locally grown tomato compared to one that has been trucked across america.

31:50 I wanna grow strawberries, cause i can't find decent strawberries in the store.

Interview - District leader

Who: Charlotte K **Date:** 2020-04-28 **Was the interview Recorded?** No, notes are paraphrased **How was it conducted:** In person

Why: She is the district manager for one of the schools in Vallenbæk Municipality

We would like to have school gardens, and i currently dont know why we dont have one, since it's a great learning resource

I guess no one has planned one yet.

If we chose to have one, we would properly need someone to maintain it, and that has to come from our school budget.

If we create the garden as a community garden, we would need to have some sort of regulation of who can come in and out since someone might destroy the gardens otherwise.
I think we would need a fence or the area to be monitored. Maybe if you only had access throught the school?

If the community did something elsewhere, a collaboration would be nice so we could learn and make a trip of showing another place for the kids.

If the community was in the schoolyard, it would properly be bigger, but then the municipality could share some of the expences since it would also be for them.
It's funny cause it will cost the same for the municipality either way since they are also the ones giving us the money, it's just diffrent funds.

Creating a school garden is really interesting though, and if we could combine it with other subjects it would be even better! we could even make a development throughout the school from small plants to growing your own food, and then try this "hydroponic" you're showing off at the makerspace at the moment! that would be intersting!

There are after all a lot of schools around denmark who are implementing or already have school gardens! and then some companies are making teaching material that is very easy for the teachers to go through.

Interview – Teacher

Who: Rasmus **Date:** 2020-03-20 **Was the interview Recorded?** No notes are paraphrased **How was it conducted:** In person
Why: Rasmus is a teacher who has used plant growing in his educational material before

Have made small growing plants before in milk and juice cartons

he has grown small plants and flowers

“What soil is best for the plants”

“what type of fertilizer is best for the plants ?” (egg shells, coffegrounds etc)

We can use a school garden, but if it is off site, it will need to be very close by, otherwise we might not use it.

over the span of 3 years, we will maybe have 3-4 subjects involving plants.

If we had a plant garden, someone would needs to look after the garden, and who should that be?

If we had a local garden big enough more classes could use it.

The combination across diffrent subjects are very sought after!

Feedback from prototype

Participants : 4

How was your experience with hydroponics?

sadly one plant died, but we tried planting a new one and that one is happy as ever! has been interesting to follow the proecss

It has been super easy since the plants don't really need any "attention", my daughter has been very exited over the experiment!

Really interesting and kinda challenging

Super easy! i'm hooked!

If you saw a post about hydroponic or other ways of learning a new skill, where you see it?

Facebook or municipalitys local letter

In a local facebook group, otherwise "school intra"

Through the municipality or through the news maybe?

Facebook or social media alike, not really anywhere else if it's online

Have you through this process told anyone else about this experiment (freinds/family etc)

Due to covid lockdown, we haven't really had visitors, so it has only been the ones nearest to us that has seen it, they thought it was interesting as well!

Yea! my dad has been interested! he likes plants and this will make it easier for him since he travels a lot!

Primarily family, however not in depth.

Yea, i have told my mom and some freinds when they visited and have seen how exited i have been over having plants actually grow!

Would you consider to use hydroponics in the future? what are the implications, pros/cons for you?

I would consider it! i live on 4th floor and can therefore not really use soil

We will surely look at hydroponics more in depth! we have already found some videos. pro is that we can go on weekends without having to worry, and there is no need to transport soil up to 3rd floor!

100% i have killed almost all my plants, and the hydroponics plants are the only ones staying alive!

If this was a public event, who should facilitate it?

For me it does not matter, as long as there is a result.

Could be the library or through a company.

I'd think a private company, but maybe funded by the municipality.

personally i dont mind, as long as the learning event is planned, maybe the municipality could do it?

IF they had events with diffrent subjects than hydroponics, would you participate? What would you like to learn about?

Im open to learn a lot of stuff! also stuff i dont know about today, like this event. the limiting factor is what it requires for me and the space.

Could be health, echonomics, music or theater

Yes i would. could be something about climate or sustainability, an example could be how to clean without the use of chemicals (i use Enjo), or how to sort trash!

Maybe not, this one i could do from home, and i have to travel for other events.

Any comments?

It has been really fun to participate! we have bought a "click and grow" for our daughter! that has only happened due to this event!

Thanks for letting us participate!

Hydroponic learning document P. 1+2

Hydroponik (Kratky)

Hvad er hydroponik?

Hydroponik betyder groning af planter i sand, sten eller væske. Det betyder at der i denne proces ikke indgår jord. Mange har allerede leget med hydroponik uden at vide det, når vi er små og planter karse frø i vat, bomul eller lignende. (se figur 1)

Hydroponik er ikke en ny måde at gro planter på, og stammer tilbage fra Babylons hængende haver, hvor planterne her groede i vand. (se figur 2)

Denne måde at gro planter på har i mange år ikke været brugbar, indtil man for 100 år siden begyndte at udvinde næringsstofferne planterne skal bruge, og kunne tilføre dem direkte til vandet planterne stod i.

Hvad er fordelene ved at bruge hydroponik i stedet for jord?

For at forstå fordelene ved det, skal vi forstå de ting en plante skal bruge for at gro sig stor og stærk. Det vigtigste for planterne er vand og sol, uden disse vil planten dø, da den ikke kan lave fotosyntese hvor den laver CO_2 fra luften om til sukker den bruger til at gro, og uden vand kan den ikke transportere sukkeret rundt.

Det næste planten skal bruge er mineraler og salte, da planter ikke kun kan bestå af vand og CO_2 , disse får den normalt fra jorden den bliver plantet i, sit eget frø der indeholder en "mad pakke" til planten, eller ved brug af gødning.

Sidst bruger planten jorden til at lave et rod system der holder planten oppe når vinden blæser og giver planten et større område under jorden hvor den kan suge vand op fra.

Ved brug af hydroponik tager vi jorden ud af billedet og erstatter den med et andet materiale som "bare" skal holde planten, vand er der nok af, da plantens rødder er direkte i kontakt, og i det vand har vi alt den næring planten skal bruge. Dette betyder at plantens normale begrænsninger i form af manglende næring eller vand ikke tilbageholder plantens vækst. Ofte ser man at hydroponiske planter gror op til 25% hurtigere end almindelige jord planter, og giver op til 30% flere frugter.

Planterne skal ud over dette sjældent vandes da de gror i vand, og bruger også vandet mere effektivt da meget lidt fordamper i forhold til planter i jorden.



Figur 1

Karse plantet i vand



Figur 2

Babylons hængende haver

Kratky hydroponik

Det system du har fået er kendt som "kratky" metoden, og er den billigste metode af hydroponik, her bor planterne i en beholder, og laver deres eget økosystem med optag af luft og produktion af rødder der er lange nok til at ramme vandet. Metoden er ud over at være billig, også meget vedligeholdelsesfri, og der behøves kun at tilføjes vand når planten er ved at løbe tør

(her skal der være 1/5 frit i toppen for at luftrødderne stadigvæk kan trække vejret.)

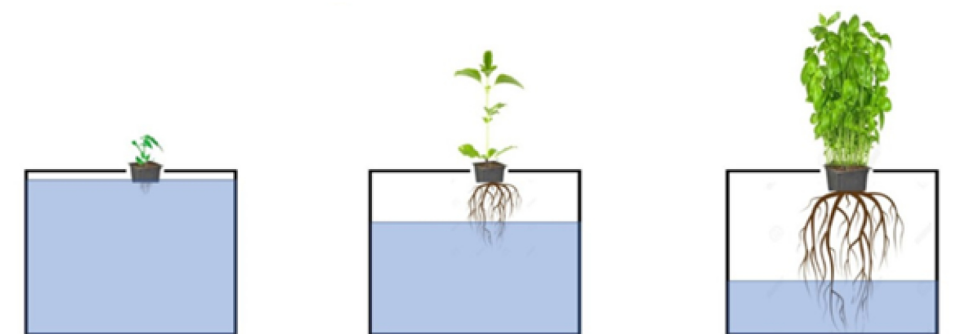
I plantens vand har man her tilføjet næringsstoffer der primært er kvælstof (N i det periodiske system) til vandet, men også fosfor, kalium, magnesium og mange andre, da planten har brug for alle disse for at gro, og kan kun gro efter den laveste fælles factor (se figur 3) Som man kan se på illustrationen er vand ofte noget af det planten mangler mest, hvor med hydroponik har planten altid adgang til alt det vand den vil have

Planten vil undervejs i vækst processen drikke vandet i beholderen, men vil også producere længere rødder der kan nå vandet længere nede. Hvilket gør denne hydroponik metode relativt vedligeholdelsesfri da planten selv justerer efter behov. (se figur 4)



Figur 3

Illustration af næringsbehov for planter



Figur 4

Plantens rodnet gror som vandstanden i beholderen falder

Hydroponic learning document P. 3+4

Hydroponisk plante anatomi

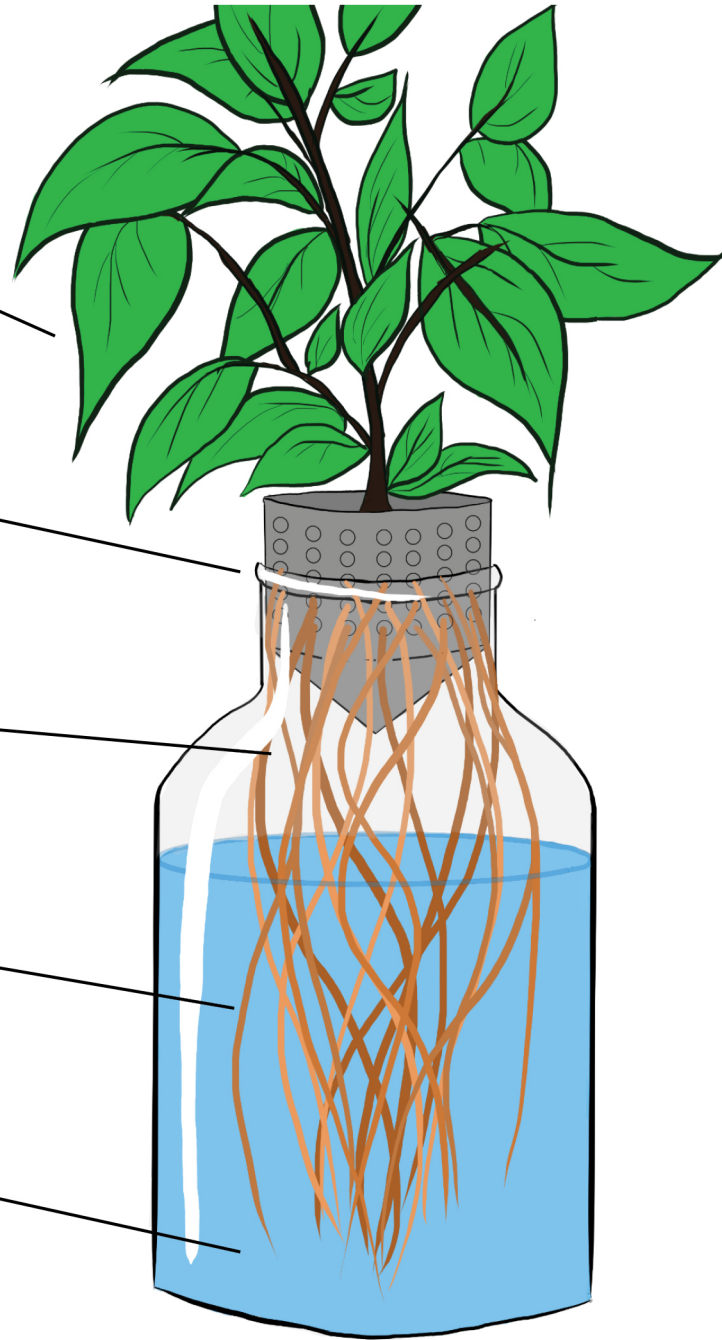
Blade
Disse laver fotosyntese, og dermed Co2 om til sukker som planten kan bruge til at vokse

Beholder
Denne beholder er en erstatning for jord. Denne sørger for at planten ikke vælter i vind og vejr

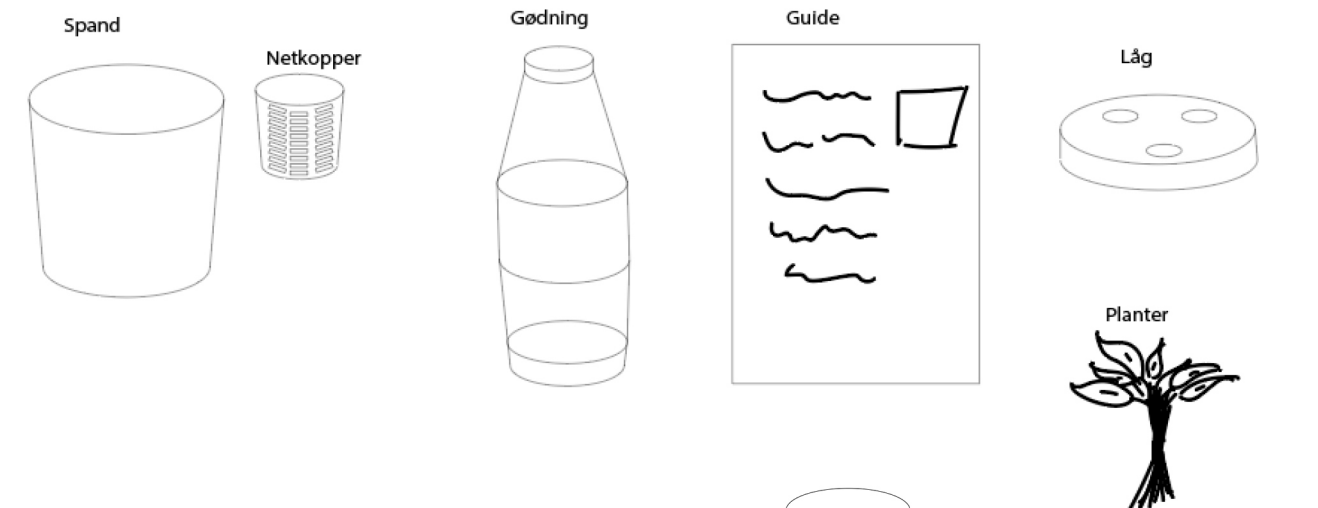
Luftrødder
Når jorden der holder luft og vand adskilt er væk, bliver planten nødt til at få luft gennem rødderne, derfor udvikler disse en masse små "hår" til at få luft igennem

Vandrødder
Disse er ofte lange og tynde, med kun få "hår" på, disse suger vandet op til planten

Vand med næring
Vandet indeholder alt hvad planten skal bruge for at kunne vokse, og har det altid let tilgængeligt for planten.



setup guide



1. Tag spanden og hæld ca 10 centimeter vand i bunden.

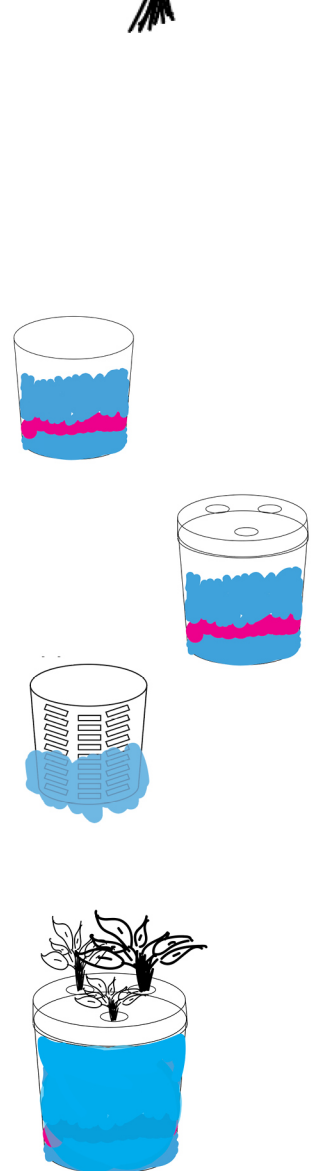
2. Hæld alt gødningen ned i vandet

3. Fyld nu spanden 3/4 op med vand (dette sørger for at gødningen bliver spredt godt rundt i vandet)

4. Sæt låget på, og sæt de to planter med kortest synlige rødder i

5. Fyld vand i til rødderne er dækket, eller indtil indtil halvdelen af netkopen er dækket.

6. Sæt planterne i rigeligt lys da dette nu er planternes største begrænsning. Planterne kan som små ikke tåle for meget vind, men kan senere når de er blevet større og deres rodnæt er stærkere (de er nemlig lige blevet omplantet) flyttes ud på en terasse eller altan.



School gardens in Egholmskole P. 1+2

Skolehave i Egholmskolen

Indhold

Målet.....	1
Hvor skal haven placeres?.....	2
Resource behov.....	3
Engangsbetalinger.....	3
Layout eksempel	4
Undervisnings sammenhæng.....	5
Perspektiv til fremtidens byer og Sustainable development goals	6

Målet

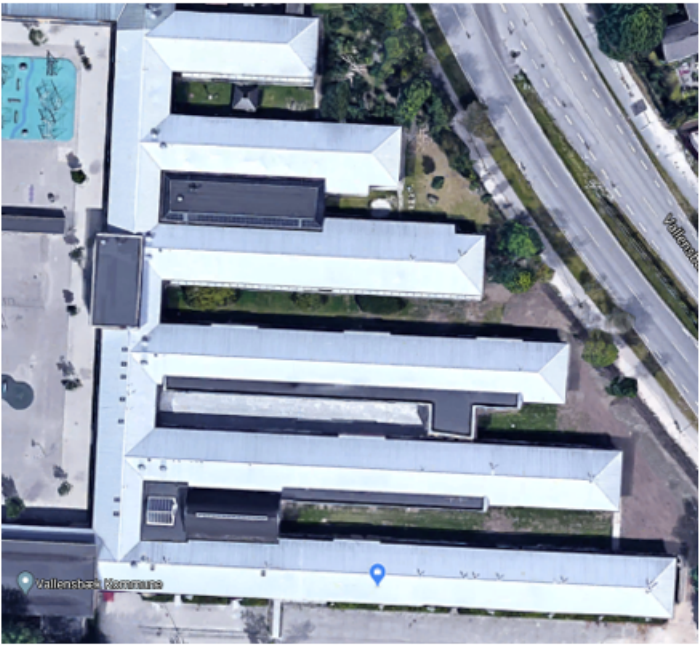
At etablere en skolehave hvor elever og lærere kan arbejde med planter i undervisnings sammenhæng, og få mere “hands on” læring. Her vil man kunne arbejde på tværs af forskellige fag, samt have et sted at opholde sig i sommer perioden.

Hvor skal haven placeres?

Haven skal placeres ud for PLC i forlængelse af makerspace, da der her på nuværende tidspunkt blot er et græs areal samt en bæk.

Området bliver sjældent brugt af elever til leg, da man skal rundt om skolen for at komme derhen eller igennem PLC.

Området er ca 50x8 meter svarende til 400m2, her er den nordlige del af området i sol og den sydlige del i skygge.
(se billede 2)



School gardens in Egholmskole P. 3+4

Resource behov

Engangsbetalinger

Plante kasser	10 * 150x50cm af 375kr	3750 kr
Hydroponics setup	36 planter (1x2 meter)	5000 kr
Hegn	10 meter	4690kr
Jord	210L X 10	2800kr
Have handsker	3stk 100 kr m moms, 60 stk	1600kr
Vandkande	2 stk	100kr
Plante skovle	40 kr stk m moms 10 stk	320kr
Frø	forskellige slags	200kr
Priserne her giver til sammen for setuppet af		<u>16.240 kr</u>
Pris for forbrugsvare		<u>2.220 kr</u>

Layout eksempel

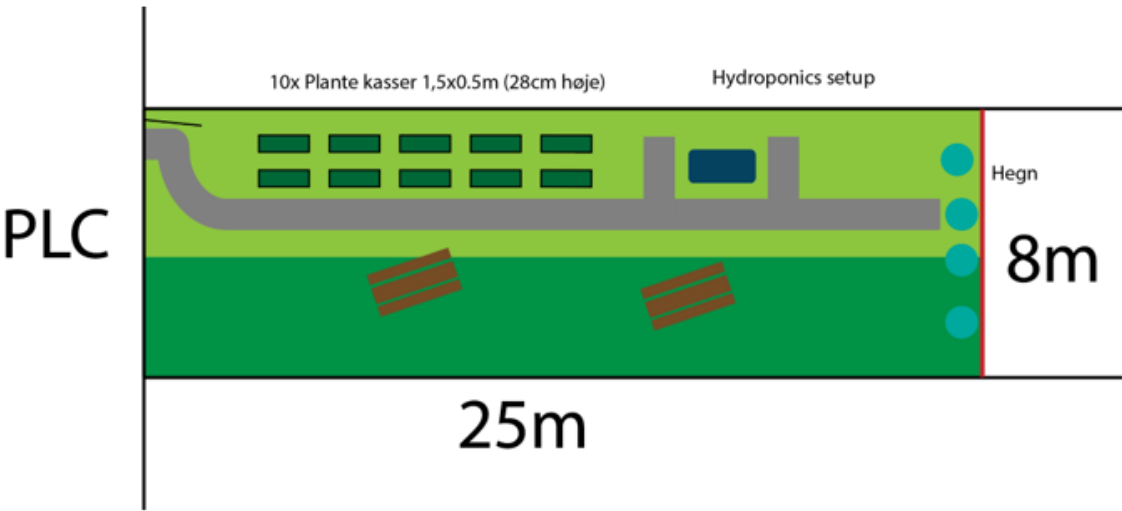
Nedenfor ses et eksempel på hvordan man kunne lave et layout, her er halvdelen af de tilgængelige areal brugt, hvor det er skærmet af med hegn fra offentligheden, dermed vil der være 25 meter på den anden side af hegnet der kan bruges til kommunal fælleshave hvis man ønsker dette.

Arealet indeholder 10 plante kasser der tilsammen giver 7,5m² at plante på, samt et mindre hydroponics system til de ældre klasser.

Her vil man også kunne lave en lille grus, sten eller asfalt sti ud til de forskellige dele af haven.

Skygge siden er i dette format holdt fri for plante kasser, men kan bruges til planter der er mere lyssky eller skal gro langsommere, dette kunne eksempelvis være mynte, eller andre krydder urter.

Her kunne man også tilføje eksempelvis bænke, så man i sommerperioden kan sidde i et grønt areal og arbejde.



School gardens in Egholmskole P. 5+6

Undervisnings sammenhæng

Skolehaven har til tanke at bruges i undervisnings sammenhæng, her skal eleverne have kontakt med groning over flere omgange, eksempelvis i indskolingen, mellemtrinnet og udskolingen.

I de små klasser skal eleverne lære det at frø, vand, jord og sol til sammen kan give en plante som man kan bruge til mad eller en salat, her vil de kunne se deres egne ting spirer og få en god første oplevelse med dette.

“Haver til maver” har lavet undervisningsforløb der vil kunne bruges i sammenhængen, som en lære kan gøre brug af og bruge som guidelines til denne undervisning.

I mellemtrinnet vil eleverne gå tilbage til at gro planter, men her kan man kombinere det med andre fag som biologi, natur/teknik, hjemkunskab eller sløjd, for at skabe en større sammenhæng med det at gro planter, her kan man snakke om plante kasserne og hvordan man laver dem, hvordan man laver gødning til planterne, eller hvordan man bruger planterne til at lave mad i hjemkunskab.

I udskolingen kan man gå i dybden med hvordan planter gror, og hvad de behøver, her kan man arbejde med hydroponics og eventuelt lave et system i makerspace, designe et autonomt vandingssystem.

Perspektiv til fremtidens byer og Sustainable development goals

Skolehaven vil være med til at promovere en fremtid hvor man gror flere ting selv og får en bedre forståelse for hvor meget energi det kræver at dyrke ting både i tid og penge.

Med den måde vi på nuværende tidspunkt lever i byerne, bliver vi nødt til at producere en masse uden for byerne, men ved at promovere lokal groning kan vi arbejde mod målet om bæredygtige byer og ansvarlig produktion og forbrug.

I dette eksempel er kun halvdelen af pladsen brugt til skolebrug, den anden side af skolen kunne eventuelt være til brug af lokale der bor i lejligheder og derfor ikke har muligheder for at gro selv, til brug for hjemløse eller til brug for studerende der hjælper med at holde orden i skolehaven mod selv at kunne gro. På denne måde vil skolehaven blive til mere end blot en skolehave, men kunne blive et sted hvor fællesskab også bliver produceret.

School gardens in Egholmskole P. 7

Links til kasser, hydroponic og hegn

https://www.vidaxl.dk/e/8719883817460/vidaxl-forhojet-plantekasse-impraegneret-fyrretrae-150-cm?gclid=CjwKCAjw95D0BRBFiEiwAcO1KDOSRBdUkns3MzeXhAAHBNQ0fml8iww51cB0ERYPxBnYmWvKM4Y7_lhoCfUkQAvD_BwE

<http://akvaponiskhave.dk/>

<https://www.jimahegn.dk/produkt/2d-panelhegn-groen-inkl-stolper/>