A thesis submitted to the Department of Environmental Sciences and Policy of Central European University in part fulfilment of the Degree of Master of Science

Environmental Learning Beyond the Fences: Adult actors' experience in a school garden programme in Hungary

Lilla SOMOSFALVI

July, 2019

Budapest

Notes on copyright and the ownership of intellectual property rights:

Author's declaration

No portion of the work referred to in this thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

_____

Lilla SOMOSFALVI

CENTRAL EUROPEAN UNIVERSITY

Growing urbanisation alters human-nature relationships leading to citizen's alienation from nature. This socio-economic change calls for new ways to connect citizens with the natural environment in urban areas. Community gardens are identified as an initiative that reconnects urban population with natural landscape, improves their environmental knowledge, and increases the adaptive capacity of local communities. While research on community gardens' role in this field is constantly growing, such literature on school gardens, a subcategory of community gardens is limited. Academic papers on school gardens focus on the benefits in students' development, while neglecting garden's impacts on adults, who are also integral actors in the complex network around gardens. This thesis aims to address this gap by analysing the environmental learning experience of adult participants and their perceptions about the garden in light of their involvement in a school garden using the social theory of learning. These aspects were explored in the context of reGARDEN located in a densely populated district of Budapest. Through field observations and semi-structured interviews, the thesis found that all participating adult groups' environmental knowledge improved in the identified learning streams including gardening and local ecological conditions; environmental elements and processes; new skills; and personal development. The study also revealed that the school garden plays a significant role in community building, recreation and in some cases even resulted in partial behavioural change. The conclusion was made that school gardens have the potential to promote environmental learning among adult actors and contribute to the social resilience of the community.

Keywords: school garden, environmental education, community of practice, community building, social resilience

Acknowledgements

I would like to express my gratitude to all the people who helped me compete this thesis. First, I would like to thank all of my interviewees for participating in my research.

I am extremely grateful to my supervisor, Professor László Pintér, for his continuous support and encouragement throughout the whole academic year and research process.

Thank you to my wonderful family who were always there for me and believed in me even in difficult times when I doubted myself. I would not be here without your love and support. I love you so much.

Lastly, I would like to thank all my friends who stood by me throughout the whole academic year and kept reminding me that I can do this. Your friendship means a lot to me.

Table of Content

List of Tables

CEU eTD Collection

viii

List of Figures

List of Abbreviations

CoP	Communities of practice
CUG	Communal urban garden
EoE	Extinction of experience
NBS	Nature-based solutions
NDD	Nature-deficit disorder
NGO	Non-governmental organisation
PAC	Public-access community gardens
SES	Socio-ecological systems

"Only if we understand, will we care.
Only if we care, will we help.
Only if we help shall all be saved."

Jane Goodall

1 Introduction

According to the United Nations' statistics, 3.5 billion people, half of the human population on the Earth lives in urban areas, which number is expected to reach 5 billion by 2030 (UN DESA 2019). Urbanisation and the rapid increase of cities is one of the mega-trends globalisation brought (Young et al. 2006). While causing numerous social and environmental changes independent from each other, expansion of urban areas also alters the human-nature relationships causing problems in various environmental and social domains (Young et al. 2006).

Limited access to natural landscapes, disconnection from ecological processes like food production and changed social and cultural structures connected to the environment lead to people's alienation from nature that primarily affects urban dwellers and especially, even if not exclusively younger generations (Louv 2008, 2011). The concept of estrangement of people from nature has been of interest to researchers observing impacts of attachment to nature on biodiversity conservation and the physical and mental well-being of people (Soga and Gaston 2015). Thinkers identified this phenomenon as the extinction of experience or nature-deficit disorder (Louv 2008; Pyle 1978). With the identification of this new obstacle in environmental conservation and sustainability, academic literature on ways bridging the growing gap between society as a whole and nature has also been growing.

The changed social and cultural structure of the Anthropocene era requires a new type of human-nature relationship (Clayton et al. 2017). This new way of connection should be adjusted to the changed opportunities, limitations of citizens and should bring authentic experience of nature into urban settings with innovative ways of learning (Westley et al. 2011). Community gardening and its subtypes such as allotment gardens, public access community gardens, were identified as innovative social initiatives, promoting Earth stewardship, and offering hands-on experience with nature to citizens to rebuild the fading link between people

and nature (Barthel et al. 2010, Krasny and Tidball 2009). Beyond reconnecting people with nature, community gardens also bring various social and environmental benefits which ultimately contribute to sustainable urban living (Barthel 2008; Turner 2011).

School gardens are considered to be a subtype of community gardens (Ozer 2007), even though, conversations around community gardens and their potential to tackle the extinction of experience and nature-deficit disorder through promoting experience-based environmental education (Krasny and Tidball 2009) mostly excludes school gardens. While school gardens do have a specific angle of environmental education focused on students, many school garden handbooks and some research papers point out the complex social network developing around school gardens, including various adult groups that contribute to the sustainability of the garden (Bucklin-Sporer and Pringle 2010; Ozer 2007; Salbe 2017). Regardless of acknowledging the role these adult groups can play in the maintenance of school-based gardens, research on their experience and the possible impacts of engagement in such interventions can have on their environmental knowledge is extremely limited. We do not know whether adults involved in school gardens are more likely to develop environmental conscious thinking or change their dietary habit to healthier one. Or eco-friendly lifestyle and habits are rather the motive behind adult involvement in school gardens than the result.

My research addresses this research gap first by mapping the network around school gardens with special focus on the linked adult participants and, second studying their environmental learning experience by applying social theory of learning used in the community garden literature.

1.1 Aims and objectives of the research

The aim of the research is to learn about the nature, extent and mechanisms of impacts of school gardens on adults, as a secondary audience with special focus on their environmental learning experience in light of their involvement. The research investigates 2 questions:

1. What secondary actors (beyond children as primary audience) and to what degree are associated with school gardens?

2. What is strengthened in terms of these participants' knowledge, capacity and practice? These questions will be investigated in the context of reGARDEN at the Újpesti Homoktövis Primary School, in Budapest Hungary. The objective of this thesis is to understand the structure of the social network around reGARDEN, identify the different actors, observe their connection with the garden and see whether this connection enhanced individuals' knowledge, competence or practice. In order to get a detailed picture of this, I conducted field research including, garden visits, semi-structured interviews with different stakeholders currently contributing to the garden as well as those involved in the establishment and operation of the garden. I also compared what has been brought up during the interviews with previous study findings in community garden research, to present a comprehensive picture of the potential school gardens have in environmental education beyond their "fences". More detailed description of the used research approach and applied methods will be provided in the Theoretical Framework and Methodology chapters.

1.2. Outline

Chapter 2 presents the literature review with the introduction of the concepts of extinction of experience and nature-deficit disorder, followed by the review of the literature on community and school gardens. The third chapter will present Communities of Practice (CoP) theory, a distinctive branch within the field of social and learning theory often used in community garden analysis. Chapter 4 will discuss methods and explain why these were chosen for analysing a school garden programme. In addition, the selection of reGARDEN as a case study location will also be justified. In Chapter 5, reGARDEN and the Újpesti Homoktövis Pirmary School, the home school the garden belongs to will be introduced by discussing its location, history, circumstances of re-establishment, current structure and its incorporation into

education. In chapter 6 adult participants and their relation to the garden and each other will be looked at using the communities of practice theory. This chapter also discusses the individual learning experience of adult participants and their perceptions about the added values of the garden. Lastly, Chapter 7 draws conclusion based on the information discussed in previous chapters and recommends research areas that should be further explored to better understand the potential of school gardens in raising environmental knowledge in the wider community and contributing to urban sustainability.

2 Literature Review

This chapter aims to present a context for this research and review the literature it will contribute to. First, I look at the issue of losing touch with nature by commenting on the literature on its causes and consequences. The following section will highlight the role of community gardens in urban areas to reconnect city dwellers with nature, focusing on the beneficial effects of gardens and urban gardening as an outdoor activity. Then, a section observing school gardens as a specific type of community gardens will follow, with its unique characteristics and impacts on the student community. Finally, I review the literature discussing the transformative power of school gardens beyond the student body, as its focus group.

While the main focus of this research are school gardens, the review discusses in detail the literature on community gardens to highlight the different research approaches used in these closely connected but in some aspects distinct study areas. By showing how research on community gardens vs. school gardens differ, the literature review also sheds light on the research gap this thesis contributes to, namely using the social theory of learning to understand the contribution of school gardens on the wider community.

2.1 Losing touch with nature

The estrangement of people from nature is often blamed on urbanisation and its by-products (Miller 2005; Stoke 2006). Over the past two decades, the impacts of people's alienation from nature have been studied from both ecological and social angles. Depending on the affected subjects, alienation from nature was labelled as the 'extinction of experience' or 'nature-deficit disorder'. This section provides an overview of the academic literature analysing these phenomena followed by discussing the significance of initiatives aiming to reconnect people with nature.

2.1.1 Extinction of Experience

The concept of 'extinction of experience' (EoE) was introduced by author and ecologist, Robert Pyle in the 1970s who describes it "as a cycle of impoverishment that is initiated by the homogenization and reduction of local flora and fauna, followed by disaffection and apathy" (Miller 2005, 431). Since then, several researchers referred to this concept when observing how the loss of people's emotional link to nature hinders biodiversity conservation efforts.

Widespread and effective nature conservation requires environmental knowledge, sense of dependence on and emotional attachment to nature not only among biologists and experts but also in the wider society (Miller 2005; Soga and Gaston 2015; Stokes 2006). In absence of these, decision-making about urban planning (McKinney 2002), environmental resources (McDaniel and Alley 2005) and ecosystem service management is guided overwhelmingly by narrowed anthropogenic interests and ignoring environmental aspects and the interlinkages between human and environmental well-being. These pre-requisites are fading as a result of the extinction of experience phenomenon among urban people (McDaniel and Alley 2005).

Biologists argue that while urban populations areas greatly rely on ecosystem services, they tend to lose the sense of dependency to them, as they do not directly experience how ecosystems function and how their services are generated and provided to them (Miller 2005). In cities natural habitat is replaced the fragmented patchwork of altered landscapes of the built environment, managed vegetation, ruderal vegetation and only small remnants of natural landscapes (McKinney 2002). Researching the transformation of biodiversity on a rural-urban gradient, McKinney (2002) found that the loss of natural habitat is coupled with reduced species richness the closer one gets to the core of urban areas. Without knowing the importance of natural resources, motivation to sustainably manage them at the local level is hindered (Miller 2005).

Extinction of experience with natural flora and fauna also results in diminished ecological knowledge among urban citizens. The correlation between place of residence and environmental knowledge was confirmed by McDaniel and Alley (2005) who observed the environmental knowledge of residents living near watersheds in rural, developing and urban areas. Their results show that there is a positive correlation between exposures to natural landscape and people's environmental knowledge (McDaniel and Alley 2005). Accordingly, in habitants of urban areas showed significantly poorer understanding of local ecological elements and processes than those living in rural areas. From this, McDaniel and Alley (2005) drew the conclusion that the process of growing urbanisation have negative effect on how well people understand their natural landscape and the working of ecosystem services, thus undermining effective and sustainable environmental resource management.

Besides environmental knowledge, extinction of experience is strongly intertwined with the fading emotional and cultural connection people have with nature – another crucial prerequisite for effective conservation efforts (Stokes 2006). According to the hypothesis of "biophilia" introduced by Edward Wilson, people have the innate ability to feel affiliation to other living things (Soga and Gaston 2015; Stokes 2006). However, while humans do have the capacity for this emotional link, it can maintained only though regular contact with nature (Stokes 2006). "Positive past and present nature experiences can create emotions including affinity, interest, and indignation that result in nature-protective behaviors" (Lin et al. 2018, 2). In the built landscapes of cities, people have limited access to green spaces and even the available green zones usually do not reflect the former natural habitat of the area, thus the estrangement from nature reduces people's affection and willingness to protect it and consider environmental aspects in urban decision making (Miller 2005).

Each consequence of the extinction of experience introduced above hampers conservation efforts and sustainable natural resource management individually but they are

7

also interconnected with each other. Soga and Gaston (2015) argues that environmental knowledge, emotional attachment and environmental-friendly behaviour are in constant synergies and through "feedback loops" these factors enhance each other. Further severing the link between nature and society is becoming "one of the most fundamental obstacles to halting and reversing global environmental degradation" (Soga and Gaston 2015, 96).

Besides the impacts EoE has on biodiversity conservation, Soga and Gaston (2015) highlights the deteriorating effect estrangement of people from nature have on people's health and well-being which is referred to as nature-deficit disorder.

2.1.2 Nature-Deficit Disorder

The concept of nature-deficit disorder (NDD) was introduced by Richard Louv, in his book titled *Last Child in the Woods*, which summarises the research on the causes leading up to children losing contact with nature and how this alienation affects their physical and mental health. Louv (2008) defines nature-deficit disorder as

> (…) the human costs of alienation from nature, among them: diminished use of the senses, attention difficulties, and higher rates of physical and emotional illness. Nature-deficit can even change human behaviour in cities, which could ultimately affect their design, since long standing studies show relationship between the absence, or inaccessibility of parks and open spaces with higher crimes and other urban maladies" (p.36).

Soga and Gaston (2015) provides a short summary of research papers which prove the positive correlation between exposure to the natural environment and short-term as well as long-lasting health benefits such as decreased risk of diabetes, circulatory heart disease and longevity. Focusing specifically on children, regular outdoor activity surrounded by natural flora and fauna improves their social, emotional as well as their cognitive and academic development (Blair 2009).

Louv (2008) while acknowledging the significant role of urbanisation in the development of NDD among children, he also identifies other reasons children stay indoors. Such aspects are changed social settings, parental behaviour and technological inventions that made

television watching and surfing the internet as major free time activities. Engaging in these mostly indoor activities not just cut off children from the benefits of play in nature but also has further negative impacts. Louv (2008) presents the results of a study carried out by the Carnegie Mellon University that found a connection between time spent on the internet, depression and loneliness.

The academic papers and studies presented above unanimously identified younger generations, especially small children as primarily affected by the phenomena of extinction of experience and nature-deficit disorder. Accordingly, most researchers suggest improved environmental education in schools (McKinney 2002; Miller 2005) sometimes with the involvement of biologists (Stokes 2006). By focusing on children, however, adults and the elderly are often overlooked, even though they are just as much affected as youths and their role in urban planning and conservation efforts is even more remarkable (McDaniel and Alley 2005). Similarly, Louv (2011) in *Nature Principle* emphasizes that nature-deficit disorder does not exclusively threatens children, but adults who due to several external and internal circumstances grew away from nature. Therefore, initiatives reconnecting people with nature should target younger generations as well as adults. Community gardens have been identified as an initiative suitable for this purpose. The potential of community gardens will be discussed in the following section.

These are only some among the long list of the direct and indirect consequences lost relationship with nature can cause. The aim of this section was to provide a brief overview of the main social and environmental impacts of the extinctions of experience and nature-deficit disorder that environmental initiatives such as community gardens could address.

2.2 Definition of community gardens

Community gardens are defined in different ways, however, most definitions presented by many scholars share some core characteristics. Focusing on these often-repeated traits,

community gardens can be defined as green areas within urban or peri-urban areas, divided into smaller plots that gardeners (individuals or families) can lease and individually manage (Lee N/D; Lin et al. 2018). The management of the whole garden is the joint responsibility of the members or a local social group usually formed through self-organisation and as a social initiative (Bendt et al. 2013; van der Jagt et al. 2017). Community garden is an arena of horticulture with heterogeneous landscape that can involve the cultivation of a wide range of fruits, vegetables, herbs, spices, medicinal plants, flowers and many other plants usually representing the natural flora of the area (Andersson et al. 2007; Krasny and Tidball 2009; Lee ND).

While these characteristics are shared by most community gardens, there can be major differences between individual gardens regarding their size, set up, location, availability to public and plot holding regulations (Andersson et al. 2007; Lin et al. 2018). Accordingly, community garden is also a generic term, incorporating many subtypes such as allotment gardens (Andersson et al. 2007), roof-top gardens (Lin et al. 2018), communal urban gardens (CUG) (van der Jagt et al. 2017) or public-access community gardens (PAC) (Bendt et al. 2013). In this literature review, I look at academic papers about community gardens that the above definition, including all subtypes.

2.2.1. Community gardens – human-nature relationship

This section will present the role of community gardens in establishing a new relationship with nature and its contribution to sustainable urban living. The literature observing community gardens and their social and environmental benefits is expansive. Community gardens in cities have been identified as social initiatives reconnecting people with the biosphere, thus combating the extinction of experience, nature-deficit disorder and addressing their negative effects on environmental conservation efforts and human well-being (Bendt et al. 2013; Clayton et al. 2017; Lin et al. 2018). Heterogeneous natural landscapes and proximity (Birky

10

and Strom 2013), personal and direct experience of natural elements (Andersson et al. 2007; Clayton et al. 2017) through which participants develop their environmental knowledge and understanding about the complex interconnected nature of ecological elements and natural processes (Bendt et al. 2013; Krasny and Tidball 2009; Lin et al. 2018; Turner 2011) were identified as the most common ways community gardens revive emotional attachment to nature.

One study showed that with the growing community garden movement in North America and in Europe, the number of community gardens in urban areas are increasing significantly, bringing natural habitat within easy reach citizens' home (Birky and Strom 2013). This increases their opportunity to experience flora native to that area rather than be solely exposed to managed or monoculture landscapes characteristic of urban green areas such as parks (McKinney 2002).

Many studies highlight the personal interaction with natural elements in community gardens as the core factor in enhancing attachment to nature and reinforcing pro-environmental behaviour. Clayton et al. (2017) found that participants in community gardening develop a direct engagement with natural elements that goes beyond observation to actual involvement. Through physical activities such as digging, planting, composting and weeding gardeners have an "embodied" connection with natural elements, which provides "interdisciplinary perspectives on environmental learning in urban context" (Bendt et al. 2013, 19; Turner 2011).

Many authors agree that community gardening is an arena offering a wide range of experience-based, interactive learning opportunities that enhance the scientific and environmental knowledge of gardeners (Barthel et al. 2010; Bendt et al. 2013; Krasny and Tidball 2009). Krasny and Tidball (2009) observed urban community gardens as sites for learning in the Garden Mosaics educational program, aiming to engage youths and adults in the experience and culture of gardening. During the longitudinal study involving surveys,

11

interviews and creative tasks done by youth participants before and after the programme, researchers observed the participants' learning experience from three different learning perspectives: cognitive theory, socio-cultural theory called communities of practice and a social theory within ecosystem management context. Analysis based on cognitive learning theory showed that the participation of youth groups is significantly correlated with increased understanding of the local ecosystem of the garden. Their scientific knowledge about environmental elements impacting the ecosystem of the garden became more detailed and nuanced after attending the programme (Krasny and Tidball 2009). Besides, observations of learning as participation in a community garden as a community of practice revealed that participation enhanced intergenerational communication and engagement in a joint enterprise that fostered the development of environmental stewardship in youth (Krasny and Tidball 2009).

The application of socio-cultural learning theory in the analysis of community gardens is documented in many other studies that also report increased knowledge regarding gardening practice, local ecology and management. One study showed that pollinator, seed dispersing and insectivore species richness and abundance in allotment gardens is higher in comparison with other urban green areas (Andersson et al. 2007). In this heterogeneous landscape, with active involvement, interviewees learnt several dimensions of site-specific local ecological knowledge of organisms, abiotic conditions and ecological processes which was significantly higher than in the cases of other urban green areas such as city parks or cemeteries (Andersson et al. 2007).

Similarly to Krasny and Tidball (2009), Bendt et al. (2013) applied community of practice theory to analyse environmental learning in four public-access community gardens (PACs) in Berlin. The qualitative study identified site-specific environmental knowledge as one of the learning streams of gardeners, besides increasing their understanding about politics

12

of the place, self-organisation and social entrepreneurship in the garden (Bendt et al. 2013). The comparative analysis of the four case studies also revealed that the dominance of learning streams depends on the gardens' running time and boundary interactions. The conclusion was made that greater learning is experienced in those PAC gardens which engage external participants from a wider variety of backgrounds through social and cultural events, and other occasions; thus, the authors concluded that PACs successfully tackle the issue of extinction of experience while also promoting urban sustainability (Bendt et al. 2013).

While these studies used socio-cultural learning theory to measure individual learning experience, the community of practice theory was also applied to measure learning at the community level, stored in the collective/social memory of community gardens (Wenger 1998). Barthel et al. (2010) observed the social-memory of allotment garden communities in Stockholm, Sweden in the ecological context of the gardens. Through qualitative research the researchers found that participation of individual gardeners, their ecological knowledge, the community's shared artifacts and documents jointly contributed to the socio-ecological memory of the community which ultimately enhanced the allotment gardens' ecosystem service management practice and its resilience against unprecedented environmental changes, which is further discussed in section 2.2.2 (Barthel et al. 2010).

Regarding ecological processes, community gardens bring food systems closer to city dwellers, enhancing their sense of dependence on the ecosystem (Clayton et al. 2017; Lin et al. 2018; and Turner 2011). Turner (2011) argues that urbanisation opened a gap between agricultural processes such as food production and citizens as they do not experience food in its natural setting. The ethnographic study showed that through so called 'embodied practice' where the body is actively involved in the practice - in the form of physical labour and eating the food grown in the garden – raises awareness about the interconnectedness of ecosystem processes (Turner 2011). Indeed, actively observing the soil-water-plant interactions increases

the knowledge of ecosystem processes (Clayton et al. 2017). A study carried out by Turner (2011) supports this hypothesis. While focusing on the food system the case study was conducted in, the community experienced significant drought that made water in general a major concern for the community, encouraging self-reflection and a search for innovative water use solutions (Turner 2011).

The physical contact with natural elements in community gardens also develops emotional attachment to nature (Andersson et al. 2007; Clayton et al. 2017). Contact with native species of flora and fauna as well as the ownership and caring for a parcel, ignite the 'sense of place', the feeling of belonging to and caring for local nature (Lin et al. 2018). A study carried out by Andersson et al. (2007) measuring local environmental knowledge, institutions and sense of place in 3 different kinds of urban green areas showed that sense of belonging to the individually run plots was high among gardeners and also increased their emotional link to their plot and to nature in general. Clayton et al. (2017) and Lin et al. (2018) also highlight sense of belonging as the core aspect of pro-environmental behaviour as it raises interest in investing in conservation efforts.

In conclusion, looking at the literature about community gardens, one can observe that researchers unanimously found environmental learning through direct involvement to be a cornerstone of community gardens, potential to tackle the estrangement of urban people from nature. Building on this, researchers also connect environmental learning, improved pro-environmental behaviour and sustainable urban living. Clayton et al. (2017) identifies improved environmental knowledge as a predictor of positive change in environmental attitude and behaviour in general. This belief is supported by Andersson et al. (2007), Bendt et al. (2013), Krasny and Tidball (2009) and Lin et al. (2018). Only Turner (2011) reports that not all observed participants with an embodied community gardening experience resulted in revived connection with nature and pro-environmental behaviour. Thus, while increased

14

ecological knowledge is apparently not always a direct predictor of changed environmental behaviour, it is necessary (but not sufficient) for reconnecting urban citizens with nature, altering environmental values and reinforcing engagement in biodiversity conservation practices (Clayton et al. 2017; van der Jagt et al. 2017).

2.2.2 Community gardens and urban sustainability

Besides raising awareness and bridging the gap between people living in cities and the natural environment at the individual level, research also shows the social and environmental importance of community gardens in urban areas (Holland 2004; van der Jagt et al. 2017; Wakefield et al. 2007). Regarding its social benefits, community gardens develop skills needed for self-sufficient food production as described above. Furthermore, they provide a platform where networks can be established contributing to social cohesion, the construction of collective memory and improved competencies (Barthel et al. 2010; van der Jagt et al. 2017). During a study observing the learning outcomes of youth participants in the Garden Mosaics program in the United States, researchers found that interaction between teenagers and elderly gardeners significantly increased community bonds and expanded students' outdoor environmental education experience (Krasny and Tidball 2009).

Self-organised communities, forming around urban community gardens require shared values, joint enterprise and collaboration of members that improves team work, management skills and social learning (Krasny and Tidball 2009). Indeed, Bendt el al. (2013) reports that communal urban gardens and more specifically public-access community gardens (PAC) bring together a great diversity of actors who while sharing certain goals and views, come from different backgrounds, bring different experiences and knowledge to the community, thus expand the group's shared memory and increase its capacity to cope with unexpected ecological changes in urban setting.

15

Besides actor diversity, bottom-up initiatives established by local groups in community gardens also enhances the resilience of its social network (Barthel et al. 2010). Four interconnected studies focusing on urban green areas and community gardens in Sweden found that the decentralised management, often characterising communal gardens in high density cities significantly improves the whole community's self-organisation and resource management skills tailoring it to local environmental dynamics (Barthel 2008).

A community with high diversity of knowledge and interests coming together under the aegis of joint enterprise and shared goals is also beneficial for the local environment. Direct and regular connection with the natural landscape in community gardens enables constant and effective monitoring of the local ecosystem (Barthel 2008; Krasny and Tidball 2009). Rapid identification of earlier unknown environmental phenomena such as sudden water shortage (Turner 2011) is required for immediate and adequate response measures. Due to Earth stewardship mentality of many gardeners, community gardens are also considered as a form of adaptive co-management directly contributing to sustainable urban living (Krasny and Tidball 2009; van der Jagt et al. 2017). Work of community gardeners integrates the participatory processes of collaborative resource management, with ongoing learning through experimentation and adaptation – which are the core elements of adaptive co-management as described by Olsson et al. (2004): "a process by which institutional arrangement and ecological knowledge are tested and revised on a dynamic, ongoing, self-organised process of learning-by doing" (75).

All of the above discussed how aspects and benefits of community gardens – combating EoE, reconnecting with ecosystem services, expanding local ecological knowledge, building community, promoting social memory development, fostering conservation efforts and promoting adaptive co-management of the local social-ecological system – contribute to the enhancement of urban resilience, more precisely social resilience (van der Jagt et al. 2017).

Recognising communal urban gardens' (CUG) role in urban sustainability, their potential as a nature-based solution (NBS) tackling socio-ecological challenges in urban settings has also been recognised and researched.

Within the framework of the NATURVATION project founded by the European Union's Horizon2020 research and innovation programme, studying NBS around the world identified many community and allotment gardens as successful forms of urban green infrastructure enhancing urban resilience and sustainability (Naturvation 2019). The important role of communal urban gardens is further emphasized in the interactive NBS search engine 'Urban Nature Atlas' prepared as part of the NATURVATION project, which includes 1000 NBS examples from 1000 European cities out of which 259 are classified as 'Allotments and community gardens' (Urban Nature Atlas 2019).

Regarding research on delivering NBS through community gardens, a recent study from van der Jagt et al. (2017) studied community garden initiatives' capacity to enhance social resilience and the governance arrangements that promote the uptake of community gardens as NBS the most. During the cross-scale analysis of six innovative community garden case studies across Europe, the researchers found that CUGs have a wide range of benefits in building bridges between people from different cultures, empowering communities and involving citizens in local decision-making which together enhance social resilience on a local level, a core feature of nature based solutions (van der Jagt et al. 2017). While acknowledging that the efficiency of governance arrangements of community gardens greatly depends on the context, human and financial resources, municipal support and public interest are identified as reoccurring factors promoting successful CUGs as NBS. The overall conclusion was made that regardless of context, an enabling environment has to be provided for the local community where they can create and run their own initiative.

Summing up the main points in Section 2.2, community gardens have been recognised for enhancing urban sustainability. Stronger community networks, self-organisation and increased understanding of the local ecological system are among the social advantages of community gardens. Concerning the status of the local environment, they foster natural flora and fauna and tackle environmental challenges in urban areas such as the heat island effect or air pollution. These environmental and social benefits mutually enhance each other. However, the basis of all these advantageous assets is rooted in community gardens' potential to reconnect city dwellers with nature through experience based environmental learning. Based on the literature review, increased environmental knowledge is one of the key indicators of the re-established relationship with natural landscapes. Without this new type of connection between people and nature, the success of community gardens as nature-based solution would be hindered.

2.3 Definition of school gardens

In search of a clear definition, it was found that academic papers focusing on school gardens often takes the notion of school gardens self-evident; highlighting only one or two key characteristics. A general definition is offered by the Foundation for School Gardens that defines it as "any kind of garden established for and regularly cultivated with the direct engagement of the community of students (mostly in kindergartens and primary schools) with the purpose of environmental teaching and learning and recreation." (translation, Iskolakertekért Alapítvány 2019d). This definition covers a wide range of school garden programs that "vary in scope, intensity of participation, and integration into the regular school curriculum (…)" (Ozer 2007, 848). Regarding their physical elements, these school-based gardens it can include indoor flower boxes, raised flower beds or fruit and vegetable gardens divided into smaller parcels within the territory of the school or at an external location (Blair 2009). Cultivation of school gardens often follows the principles of organic gardening and permaculture (Blair 2009; Salbe 2017).

Although research on community gardens rarely mentions school gardens as a subtype, the literature on school gardens consider them as a "subset of the broader community gardening movement" (Guitar et al. 2014, 111) embedded in school a setting. Indeed, just as community gardens, school gardens provide an innovative platform where community ties can be built along with enhanced environmental learning and sense of connectedness (Ozer 2007). School gardens primarily foster the environmental education and social, behavioural and academic development of children by serving as place for experiential learning; however, they also involve a diverse group of adults contributing to its sustainability (Iskolakeertekért Alapítvány 2019d; Johnson 2012; Ozer 2007).

I also consider school gardens as a subtype of community gardens and apply the definition provided by the Foundation for School Gardens complemented by the above-

mentioned characteristics. In this section I review scholarly papers analysing school gardens and highlight the different approach these have compared to community gardens.

2.3.1 Research on school gardens

School gardens have always been considered beneficial for students' social, emotional and behavioural development; however, these positive effects were mainly based on anecdotal evidence rather than empirical studies (Ozer 2007). Since the publication of Ozer's (2007) research paper, the number of academic articles on the social-psychological-ecological benefits of school gardens activity has been increasing, although focusing on its impacts on students. Papers on the benefits of the school gardening movement can be categorized around four main areas: (1) promotion of healthy lifestyle and increased nutrition (Berezowitz et al. 2015; Guitar et al. 2014; Ratcliffe et al. 2011), (2) improved academic performance (Berezowitz et al. 2015; Blair 2009), (3) increased physical activity (Wells et al. 2014) (4) developed environmental attitude (Blair 2009; Skelly and Zajicek 1998).

The purpose of the school garden movement has evolved along the socio-ecological changes taking place throughout history (Berezowitz et al. 2015). Today, inspired by loss of contact with nature and food production, increasing obesity rates among school aged children and decreased fruit and vegetable intake inspired school gardening programmes in North America to tackle these issues and promote healthy diets (Blair 2009; Ratcliffe et al. 2011; Salbe 2017).

Accordingly, some researchers focused on the potential of school gardens in enhancing understanding of ecosystem processes, knowledge about nutrition and fostering fruit and vegetable consumption. A study carried out in two school gardens located in densely populated urban areas in Australia found that the environmental intervention offered students a wider range of fruits and vegetables inaccessible before (Guitar et al. 2014). Fruits and vegetables

offer vitamins and phytochemicals that Guitar et al. (2014) found as a direct indicator of school gardens' potential to promote healthy diets.

Building on this hypothesis and the theory that changed environmental setting of learning and embodied experience with natural landscapes can reinforce fruit and vegetable consumption, an empirical study observed students' attitudes prior and after school garden intervention at schools in the San Francisco Unified School District (Ratcliffe et al. 2011). The quasi-experimental study including a Garden Vegetable Frequency test and a taste test showed that students in intervention schools could identify more vegetables than their peers in control schools. On the other hand, students' willingness to taste new vegetables following the intervention showed a significant increase, just as the variety of vegetables they consumed in and outside the school (Ratcliffe et al. 2011). Thus, the study found that school garden interventions improved nutrition knowledge and willingness to try new vegetables, promoted environmentally conscious attitude and increased the variety of consumed vegetables that jointly improved the quality of students' diet (Ratcliffe et al. 2011).

A link has also been found between healthy eating habits including nutritious fruits and vegetables and improved academic performance. Experience-based learning can be integrated into a wide range of subject not limited to environmental sciences, thus it is expected to enhance students' academic knowledge, as well as, cognitive skills in all study areas (Blair 2009; Salbe 2017). Regardless of Blair's (2009) and Salbe' (2017) hypothesis, empirical studies found that participation in school gardening interventions improves students' skills primarily in science subjects and are less likely to improve scores in arts classes (Berezowitz et al. 2015). In their overview of empirical studies, Berezowitz et al. (2015) presented the findings of five papers comparing the academic development of students in schools with and without gardening intervention. The authors conclude that there is some improvement in maths scores among students attending gardening classes but no significant improvement in language and arts

scores (Berezowitz et al. 2015). Regarding cognitive development, school gardens promote skills like observation, ordering, comparison and communication; however, Blair (2009) highlights that stimulated cognitive skills are the result of the experience-based activity happening in school gardens, rather than the school gardening intervention itself. Thus, any kind of experience-based learning environment would trigger improved order of cognition (Blair 2009).

Experience-based learning activities also provide an opportunity for increased physical activity. School gardening in most cases takes place outdoors involving physical labour as opposed to classroom-based learning (Ratcliffe et al. 2011). Another comparative study of pre- and post-school garden intervention data of 12 schools in the State of New York showed that during outdoor classes held in the school garden, students take a variety of postures and movements that replace sitting, taking up 84 % of traditional classroom setting lessons (Wells et al. 2014).

Many studies focusing on the health benefits of also mention changed environmental attitude in students as a result of involvement in school garden programmes (Berezowitz et al. 2015; Guitar et al. 2014; Ratcliffe et al. 2011). As research focusing on community gardens shows, studies about school gardens also reveal its potential to shape participants' environmental attitudes. One study on the GREEN project in the U.S. in the 1990s analysed participating students' motivation and environmental attitude prior and after the school garden intervention (Skelly and Zajcek 1998). The survey results, including Likert-scale questions about attitudes showed that after participating in the programme, students scored higher in questions about the state of the environment and human impact.

While all of the above benefits apply to school garden programmes, many researchers emphasize that garden interventions vary from school to school which effects the degree

students can benefit from them, making cross-scale studies and overall generalisation inconclusive (Berezowitz et al. 2015; Blair 2009).

Another limitation of these studies is that they solely focus on the impact on students, while effects on the wider community is often ignored (Ratcliffe et al. 2011). School gardening guide books and some researchers highlights that while the establishment of school gardens is justified by the (sometimes anecdotal) positive impacts they have on children, the support and engagement of various actors required for the success and sustainability of school garden programmes is often overlooked (Bucklin-Sporer and Pringle 2010; Ozer 2007; Ratcliffe et al. 2011; Salbe 2017). Salbe (2017) identified a list of important actors contributing such as school management, teachers, janitors, kitchen staff, cleaning staff, parents and local communities.

Looking at the social network forming around school gardens, Ozer (2007) analyse the relationships among actors from a social ecological-transactional perspective of human development. Applying this framework in the school garden context, children are viewed as "nested within immediate contexts or micro-systems (e.g., school, family, community) that reciprocally interact with each other and the child over time to shape development." (Ozer 2007, 851). Accordingly, changes in students' behaviour and any kind of involvement in the work of school gardens can affect caregiver, and other adult groups involved in the programme (Ozer 2007).

Only a few studies include adults; however, even these mostly observe the perception of teachers and parents about how school garden intervention affect students' eating habits. For instance, Heim et al. (2011) study the change in home food environment and parents' perception about children's fruit and vegetable consumption following a summer school garden intervention in California. The findings were in line with Ratcliffe et al. (2011).

Other than studies like Heim et al. (2011), no research paper was found observing the network of community members developed around school gardens. Literature observing this would be

also beneficial for mapping school gardens' potential to connect wider society to nature and promote environmental sustainability beyond individual health impacts, just as community gardens do (Ozer 2007).

2.4 Conclusion

The literature review revealed a lack of research on about school gardens and their impact. Filling this gap would require purpose-built research; building on the broader literature on community gardens. By acknowledging the connection between community gardens and school gardens as discussed by Guitar et al. (2014) and Ozer (2007), there is a possibility to analyse school garden programmes using the theories and methodology used in the community garden literature. In addition, this research could also study the potential contribution of school gardens in promoting sustainability. Accordingly, as presented in Section 2.2, developing close connection with nature and increased environmental knowledge is a definite prerequisite of pro-environmental behaviour and sustainability. Thus, observing school gardens' potential to spread and increase environmental knowledge in wider community could be a starting point in filling this knowledge and scientific literature gap.

This master thesis attempts to address a small part of the research gap by mapping the social network forming around community gardens, identifying stakeholder groups, observing their participation and measure their self-reported environmental knowledge.

3 Theoretical Framework

This section introduces the concept of communities of practice developed by Wenger (1998) as the theoretical framework of this thesis which guides methods section, data collection and data analysis. First, the selection of this particular framework is briefly justified, which is followed by a detailed introduction of the concept, highlighting aspects that are particularly relevant in the context of this research.

As mentioned in the literature review, many research papers use the communities of practice term based on the socio-cultural theory of learning to study individual as well as community learning experiences and memory in community gardens (Barthel et al. 2010; Bendt et al. 2013; and Krasny and Tidball 2009). Krasny and Tidball (2009) argue that community gardens can be considered communities of practice because of the multiple types of learning opportunities offering to its members as well as to the group as a whole. Acknowledging this reasoning with the previously mentioned view of Guitar et al. (2014) and Ozer (2007) who consider school gardens as subsets of community gardens, using the communities of practice theory to observe environmental learning in the broader community of school gardens can be justified.

In this attempt, the study carried out by Bendt et al. (2013) could be of particular help, as the researchers applied socio-cultural learning theory to examine the environmental learning of individuals in public-access community gardens. Thus, this thesis uses primarily the paper by Bendt et al. (2013) as guidance in analysing the environmental knowledge of adult groups in school gardens.

The concept of communities of practice (CoP) emphasises the importance of participation and boundaries in the process of individual and social learning (Wenger 1998, 2010). CoP indicates a unit of individuals and activities linked by practice and shared labour

25

that contributes to the accumulation of shared knowledge. Accordingly, CoP have three defining dimensions shaping the competence of the community: (i) mutual engagement, as the basis of connection and collaborative action of people; (ii) joint enterprise, a specific theme or topic participants eager to achieve; and (iii) shared repertoire of the tools that support the community to pursue their enterprise accumulated by the community and obtaining their meaning in the context of the CoP (Wenger 1998, 2000).

Learning is a central element of the communities of practice. Wenger argues that learning occurs in CoPs as a result of the constant duality of participation and reification which ultimately contributes to the shaping of participants as well as the community's identity (1998). Participation in CoPs indicates multiparty collaboration that goes beyond direct engagement – through participating in a specific practice our experience is intertwined with the competence of the community which mutually affect each other and can lead to knowledge building both at the individual and community level (Pahl-Wostl et al. 2007; and Wenger 1998). Wenger (2000) argues that learning can happen through their interplay.

Besides participation, during shared practice the community develops its own set of abstracts, tools, materials, concepts etc. This 'thing-making' process is defined by Wenger (1998) as reification, the creation of a set of projections which beyond objectifying abstract concepts like membership, also contains the tools and material objects which gain new meaning within the context of the community (1998). Boyer and Roth (2006) refer to these tools and objects as a set of socio-material resources created by and constantly expanded by the community. In case of gardens, these resources can be membership, shared values, rules and aesthetics, the tools, flowerbeds etc. (Barthel et al. 2010). Wenger (1998) argues that participation and reification in a group setting mutually require each other and are also complementary as they make up for each other's shortcomings, thus essential for social learning to happen.

26

Accordingly, social learning can be defined as the product of engagement in the activity of a social community through the interaction and relation between the person and the world (Lave and Wenger 1991; Wenger 1998, 2000). However, this understanding is only one of the many interpretations of the concept which has evolved causing confusion regarding its clarity and undermining its universal comparability (Reed et al. 2010). In the past decades, a more normative understanding of social learning has emerged primarily in the field of natural resources management (Barthel et al. 2010; Reed et al. 2010). This approach defines social learning as "a process of social change in which people learn from each other in ways that can benefit wider social-ecological systems" (Reed et al. 2010, 2). This understanding is also referred to as sustainability learning, an essential component enhancing adaptive capacity development and thus sustainable development and governance of socio-ecological systems (SES) (Pahl-Wostl et al. 2007; Pahl-Wostl et al. 2008; Tabara and Pahl-Wostl 2007).

While these understandings of social learning have great credibility in the field of environmental sciences and natural resource management, as this thesis focuses primarily on the social context of school garden programs, it relies on the non-normative definition of social learning drawn up by Lave and Wenger (1991) and Wenger (1998, 2000). Accordingly, this thesis sees social learning as the outcome of active participation in the practice of a social community which contribute to the identity and meaning making practice of individual as well as the community (Wenger 1998) complementing it with the engagement of the connected environment (Barthel et al. 2010; Boyer and Roth 2006). Similarly, to Wenger (1998), Boyer and Roth (2006) argues that when observing learning and knowledge, gain should be observed as "the result of patterned actions, materials and social interactions" gathered around a socially triggered activity (1031). However, focusing on the whole activity – including its subject, object, tools, guiding rules, community and division of labour – the understanding of Boyer

27

and Roth (2006) also indicate the bio-physical environment it takes place in, from which the activity cannot be decoupled.

This theory supports the approach of the thesis as it observes the environmental sensitization potential of school garden programs at the broader scale of the community that interacts with it. In case of school gardens, the physical environment is not only the area where joint enterprise takes place, but it also has a crucial role in involving different actors in the practice. The garden itself is part and parcel of the practice, with the potential to transform the purpose of the initiative as well as those associated with it one way or another. Thus, adding another layer to the social relational network by involving an environmental level. This multi-level framework that appears in the structural framework of Barnes et al. (2017) observes the social and ecological ties of SES from a resilience perspective. They argue that in the complex system of SES, configurations between the social and environmental levels are channels of knowledge and facilitate learning. Through this learning process actors cooperate with each other which strengthens community ties and builds trust, factors which are required for adaptability and transformation, the key elements of resilience. While Barnes et al. (2017) observes the role of social and ecological ties from the SES perspective, they mention the behaviour forming potential of these relationship, which also supports the importance of environmental elements when analysing the social learning potential of school gardens.

In the context of the thesis, *boundary* as an essential element of the CoP concept shaping the collective memory and competence of the group as well as individual learning and identity also has to be introduced (Wenger 2010). Participation is by definition coupled with boundaries to identify the degree of belonging to the given CoP. Lave and Wenger (1991) suggest that while central participation should not be defined – as it would indicate a finite amount of knowledge that can be acquired within the community which is impossible due to the dynamic, always evolving nature of the community's competence – the term full participation could be

used referring to membership within the CoP. However, in practice, participation in shared labour has a great range of diversity, and engagement in the form of external relations – through boundaries – also count as participation (Wenger 1998). While the role of boundaries is to divide people belonging to a CoP from others and hence to make transition between CoPs more troublesome, it also serves as a point of connection between members of other CoPs. Wenger (1998) argues that boundaries

Figure 1. Social learning in boundary interactions. The proportion of the learning both on the individual and on the community level depends on how much their experience and competencies are intertwined. Source: Bendt et al. (2013).

offer a platform where CoPs interact with the world and facilitate interaction the competence of the community can mingle with the experience of members of other CoPs, thus, creating a fertile area for learning that can be beneficial for individuals as well as for the community (Wenger 1998, 2010) (Fig. 1). Accordingly, both intra-CoP and inter-CoP learning takes place in communities of practice.

The basis of boundary connections can be participation, reification and the practice itself (Wenger 1998). While all three of them are relevant in the analysis of interaction between different communities of practice, in the context of the thesis the concept of periphery, subcategory of practice-based boundary link are the most significant (Fig 2). Periphery indicates a platform that a specific community of practice opens for the world, offering different forms of access to its practice (Wenger 1998). The periphery is half in, half out of the CoP, allowing a certain degree of accessibility for outsiders – even actors who do not intend to become full members of the CoP can have a glance or even actively participate in the community's activity (Wenger

Figure 2. Peripheries as a subcategory of practice-based boundary link. Source: Wenger (1998).

1998). Based on different degrees of involvement, the engagement can greatly vary from full membership to extreme peripherality. The position of actors on this scope of involvement define their contribution to and benefit from the CoP (Wenger 1998). This system of multi-layered involvement characteristic of a CoP also allows multiple types for learning – available for outsiders as well as for the community. Similarly, the literature suggests (Salbe 2017) school gardens often have role in community building by offering a 'peripheral experience' through which external actors can engage in the life and labour of the garden for different degree (Wenger 1998).

Thus, analysing the degree and nature of participation in a school garden as a learning environment and the connections between the actors, would enable us to map the learning potential of a given activity as a proxy. While learning potential does not measure impact directly, it is essential for the types of behaviour change that can directly result in impact. Therefore, mapping the social network of school gardens as a community of practice and the

learning experience of participants would make sense. Accordingly, the thesis aims to address the following questions:

(1) What actors (internal-external) to what degree are associated with school gardens?

(2) What is strengthened in terms of participants' knowledge, capacity or practice?

4 Methodology

The methods of this thesis involved: (1) the presented literature review (2) participation on school gardening workshops and events to gain general understanding on the school gardening movement in Hungary including informal conversations with key actors in the movement to identify a school garden suitable for the study, (3) in-depth interviews combined with field observations in the selected reGARDEN school garden, (4) analysis of interviews with guidance of the above-mentioned studies.

4.1 School gardening workshops and choice of case study site

At the first phase of the research period, after scanning the literature on school gardening interventions on the global scale, I aimed to broaden my knowledge about the school gardening movement in Hungary. Academic literature focusing on school garden programmes in Hungary is very limited; therefore, I attended workshops and events of the Foundation for School Gardens, the most prominent organisation regarding Hungarian school gardening (discussed in section 5.1), to better understand the state of the school garden movement and to be able to select an adequate case study location. One of the workshops was within the framework of the National School Garden Development program organised for school garden leaders where I had the chance to meet representatives of many school gardens in the country. In the case study selection process, András Halbritter, director of the Foundation and Erika Saly representative of the Hungarian Institute for Educational Research and Development were of great help suggesting possible locations which met the three primary set criteria: (1) located in urban setting, preferably in bigger cities, (2) running for more than 3 years (3) good example of involvement of external actors. Out of the suggested interventions, the reGARDEN school garden at the Újpesti Homoktövis Primary School, in Budapest was selected.

4.2 Open-ended interviews and field observations

The purpose of the study was to gain better understanding of respondents' degree of participation in school gardening intervention, their learning experience (explicit and implicit) and their perception of the gardening practice which could be best done through in-depth interviews. The interviews were semi-structured and primarily consisted of open-ended questions to enable participants articulating their personal experience and perceptions to the fullest (Patton 2002). As Bendt et al. (2013) argues, open-ended questions "foster flexible and reflective conversations capable of addressing both conscious and experienced learning as well as tactic forms of learning (21).

Respondents were selected through snowball sampling, often used for social network investigation (Robins 2015). The initial respondents were the head teacher of the school and the science teacher who has been managing the school garden from the beginning (seed set). This teacher determined most of their network partners, including teachers, gardeners and external actors who contributes to the garden today, or had been involved in its establishment (wave 1). The respondents of wave 1 also determined a new set of partners (wave 2). As respondents in wave 2 only nominated each other or participants already determined in wave 1, I stopped the snowball sampling at the level of wave 2 (Robins 2015).

Table 1. Information about respondents and interview dates.

ID	Status	Interview date
1.	Head teacher	27 May
2.	Science teacher	4 Jun
3.	Teacher	4 Jun
4.	Teacher	4 Jun
5.	Teacher	4 Jun
6.	Teacher	4 Jun
7.	Family garden plot owner (parent)	4 Jun
8.	Family garden plot owner	4 Jul
9.	Family garden plot owner (parent)	6 Jun
10.	Family garden plot owner (parent)	10 Jun
11.	Family garden plot owner	12 Jun
12.	Parent	17 Jun
13.	Parent	17 Jun
14.	Parent	19 Jun
15.	Representative of Contemporary Architecture Center	20 Jun
16.	Parent	21 Jun
17.	Family garden plot owner (parent)	22 Jun
18.	Parent	27 Jun
19.	Parent	2 Jul
20.	Parent	3 Jul
21.	Parent	3 Jul
22.	Family garden plot owner	3 Jul
23.	Representative of Telekom	email

Twenty-three semi-structured interviews were carried out between May and early July 2019. While this number does not cover the whole community and the time and capacity was not enough to map the entire social network built around the school garden, multiple respondents from each category were interviewed. These were adequate to identify patterns and tendencies characterising each adult group and allowed to model the adult group network. The head teacher of the school and representatives of companies and non-governmental organisations who were key actors during the establishment of the garden were interviewed to understand the history and trajectory of the garden programme. Respondents were approached through the school garden's private Facebook group, directly in the garden, or through email. 17 interviews were conducted face-to-face in the garden, at the school or at an external location while the remaining 7 were conducted via telephone, email or Skype. With the exception of two interviews – due to refused consent and technical difficulties – all interviews were recorded and transcribed.

4.3 Identification of adult groups

For exploring the learning experience of adult groups, as a start these adult groups had to be identified. Based on respondents' connection and level of participation at the reGARDEN they were classified into three groups: (1) teachers, (2) parents, and (3) family plot owners. First, in order to identify the level and way of these adult groups participation in the school garden, responses were coded according to Wenger's (1998) fundamental elements in communities of practices, "shared repertoire", "joint enterprise", and "mutual engagement". The category shared repertoire was replaced with Boyer and Roth's (2006) concept of "socio-material resources" as considering their definition (introduced in Section 3) "socio-material resources was more suitable in the context of the reGARDEN (Bendt et al. 2013). Based on these findings, the community of practice matrix of the reGARDEN was drawn up including all three adult groups in their appropriate position.

4.4 Data analysis

After detecting adult groups' participation in the school garden, interview transcripts were analysed by applying the principles of open coding. While the main objective of this thesis was to research the learning process of respondents, open coding was used to explore the overall experience of the identified adult groups and "open up the data to all potentials and possibilities contained within them" (Corbin and Strauss, 160). Accordingly, I scrutinized the transcripts for general reoccurring themes and concepts.

From this analysis, another significant category was discovered additionally to the expected learning experience: the added value of the garden. Regarding the learning experience of adult groups, three sub-categories were identified which showed some overlaps with the learning streams identified by Bendt et al. (2013) complemented with novel items specific for the reGARDEN. Similarly, sub-categories were identified in the added value group, as well. In

every cases these discovered themes and concepts and their sub-categories were scrutinized in the cross analysis of the previously identified adult groups to see whether any patterns can be found between their location in the community of practice matrix and their experience.

4.5 Limitations of the research

The research has some limitations which have to be mentioned. First of all, an in depth pilot study would have been reasonable considering the small number of research papers on adult groups' experience in school garden programmes, especially in Hungary. A pilot study like this could have made the interview question list more tailored to implicit and explicit learning processes of adults in school gardens; however, the time limitation of the research did not allow that.

Another difficulty was regarding the case study location selection. Despite multiple attempts requesting access to the list of school garden programs including basic data (location, size, physical features, external actor involvement etc.) from the Foundation for School Gardens, only limited access was granted. Of course, in the selection period I received many support from experts in this domain, nevertheless, the case study location could have been more informed.

In addition to this, the interview period coincided with the last three weeks of the academic school year which was a particularly hectic period for teachers and parents alike, thus they were less responsive to emails and messages within the private Facebook group. Thanks to the intervention of some enthusiastic respondents, I was able to conduct interviews with multiple representatives from each adult group, however, I was not able to map the whole social network of the garden which had been one of the preliminary – perhaps unrealistic – aims of the research.

Finally, while the chosen qualitative method was suitable to explore adult's experience in a school garden setting, by no means can the results be seen as general or conclusive, rather exploratory. Further research would be needed with mixed methods (quantitative and qualitative) to enable researchers to draw more general conclusions about the potential of school gardens in the domain of environmental education among adults.

5 ReGARDEN: Context, Background and Description

This section will provide an overview of the school gardening movement in Hungary, to put into context the case study of the reGARDEN school garden at the Újpesti Homoktövis Primary School in Budapest. Afterwards reGARDEN will be introduced in detailed including its demographic parameters and the circumstances around its establishment. These factors are of crucial importance in order to fully understand and analyse the network around the school garden and the identified adult groups' environmental learning experience.

5.1 School garden programmes in Hungary

In Hungary, school gardens were a significant element of primary education, providing a setting for gardening and agricultural teaching and learning until the mid-20th century, endowing students with common gardening knowledge and skills needed for everyday life (Halbritter 2016). The 2nd World War brought an end to the heyday of school garden practices – following the destruction of the war, the introduction of new, modern agriculture technologies superseded gardening education. After decades long hiatus, from the 1980s, school-based garden programmes have been on the rise again as a response to the unfolding environmental crisis and sustainability movements world-wide (Halbritter 2016). In Hungary, the school gardening movement started to really flourish in the 2010s, currently being in its prime with a constantly increasing number of garden interventions focusing on environmental education, promotion of environmental conscious thinking and healthy dietary habits among students (CSERFA Közhasznú Egyesület 2013, Halbritter 2018).

At the beginning of the 2000s, sustainability education appeared in the National Core Curriculum as a fundamental pillar of primary and secondary education. The following National Core Curricula (2003, 2007, 2012) put even more emphasis on environmental consciousness and sustainability teaching; however, with only limited guidelines and technical support regarding their implementation (Kónya 2018). Accordingly, school gardens or any

other forms experience-based environmental education do not appear in the Core Curriculum of state schools – with the exception of alternative education institutions such as the Waldorf school system –, the establishment and incorporation of these into certain subjects or extracurricular activities depends solely on the school management and the motivation of an enthusiastic teacher or teacher body (CSERFA Közhasznú Egyesület 2013). School gardens appear in the densely populated cities such as Budapest and its residential areas, towns in the country side and also in underdeveloped settlements (CSERFA Közhasznú Egyesület 2013).

By the 2010s, in the absence of top-down management of school garden programmes in the country, locally and regionally formed organisations in collaboration with universities and NGOs started to support and promote the development of individual school-based garden initiatives (CSERFA Közhasznú Egyesület 2013). In 2011, one of the first tenders supporting the establishment of school gardens and the greening of school yards was offered jointly by the World Wildlife Fund (WWF) and the Hungarian Cetelem Zrt. This was followed by several other tenders announced by different NGOs focusing on school garden development. With the many locally formed organisations and programs, the need for an overarching institution, connecting these separate members of the school gardening movement become necessary and realistic. In 2012, a School Garden Technical Workshop (Iskolakert Szakmai Műhely) was formed to fill this void and promote the collaboration, practice sharing and alliance of individual school garden programmes nation-wide (CSERFA Közhasznú Egyesület 2013).

Today, the non-governmental 'Foundation for School Gardens' plays the most significant role in connecting the school garden programmes in Hungary, providing technical and financial support to them, as well as, developing a methodology for garden activities (Iskolakertekért 2019b). Since its establishment in 2015, the Foundation is building and maintaining a database of school garden programmes in the country and researching the status and characteristics of school garden programmes and interventions. The NGO also coordinates the constantly

expanding School Garden Network, which links the members and offers a platform to share experiences, practices and thus encourage development.

Since its foundation, the work of the NGO and school gardens' role in primary and secondary education, gained increasing government interest. In 2018, upon the initiative of the Ministry of Human Capacities, the Foundation also carried out a survey mapping currently running school garden programmes and interventions in Hungary (Halbritter 2018). The study showed that approximately 1118 schools and kindergartens run a garden for education purposes which is 17% of all education institutions in Hungary. Participation and supplying data was on a voluntary basis; therefore, this is only an approximate number. The survey also reveals the students' age distribution, identifying kindergartens as the type of education institution running most gardens, followed by primary and secondary schools. Regarding garden elements, flower beds, vegetable gardens, herb gardens and composting were the top four most frequently occurring elements.

The National School Garden Development Programme is the most recent project of the NGO which started in 2018 and currently running in collaboration with the Karitasz of Vác Diocese, the Hungarian Chamber of Agriculture and with the support of the Ministry of Agriculture (Iskolakertekért 2019a). In the framework of the first phase of the programme called 'Foundations Sub-project' which has successfully ended in July, 2019, 50 school gardens were supported nationwide. The Foundation provided the technical mentoring for beginner, intermediate and mentor gardens in partnership with additional sponsors, while tools and equipment was purchased with the financial support of the Ministry of Agriculture (Iskolakertekért Alapítvány 2019c). The reGARDEN was also among the winners in the mentor category.

5.2 Introduction to Homoktövis Primary School and reGARDEN

5.2.1 Location, parameters

The Újpesti Homoktövis Primary School with its ReGARDEN school garden is located in Újpest-Káposztásmegyer, the north easternmost district of Budapest (Fig. 3).
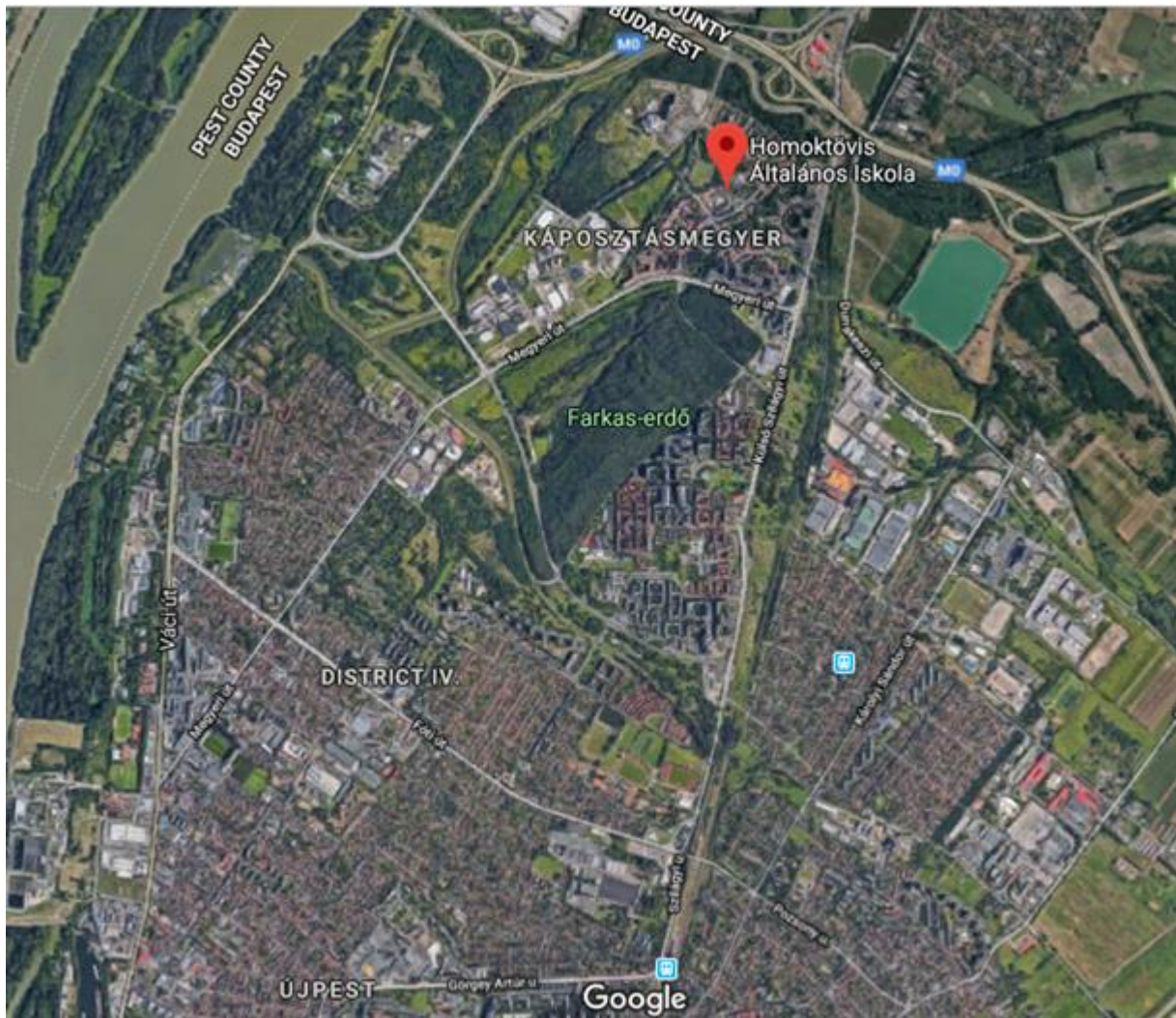
Figure 3. Map showing the Újpest-Káposztásmegyer district where the Homoktövis Primary School with its ReGARDEN school garden is located, showing the residential areas surrounding the shcool. Source: Google Maps, www.google.com/maps

The district was an industrial town with its own municipality until 1950 when it was merged into the capital (Újpest 2019). The industrial profile of the area has not changed; however, apartment blocks and densely populated urban areas replaced the once suburban landscape. Since the 1980s, Káposztásmegyer, a new neighbourhood within the district has started to form with a mixed landscape including high density modern residential areas along with green

41

suburbs close to the largest green area of the district, the Farkas Erdő, functioning as a park forest (Zöldkalauz 2019). The school is located within this residential area surrounded by multiple-story apartment blocks (Fig. 3).

The Újpesti Homoktövis Primary School has been actively promoting sustainability through its education curriculum, building maintenance and everyday life for which it received the Örökös Ökoiskola (Eternal Ecoschool) title in 2016 (OFI 2019). The concept of environmental consciousness appears in its waste collection campaigns, dedication to promote composting, and participation in competitions and campaigns related to sustainability, conservation and recycling. In all of these activities the student body, as well as, the broader community of the school including parents, relatives and connected local organisations are encouraged to actively take part, thus promoting social cohesion as a factor of sustainability (Homoktövis-suli 2019a, OFI 2019). Moreover, this January the school received the 'Bird Friendly School' title from the Hungarian Ornithological and Environmental Protection Institution for its efforts in bird protection and feeding (Homoktövis-suli 2019a).

The garden, named reGARDEN (újraKERT) itself is located at the back yard of the school on 400m^2 out of which 250m^2 is cultivated land. The garden is divided into approximately 20 plots of different size with some common areas (Közösségi kertek 2019). The prominent garden elements are a vegetable garden, (raised) flower beds, herb garden, fruit trees and bushes – including sea buckthorn, the eponym of the school – with composting sites, two cabins for storing tools and equipment and rainwater collectors. The garden allows only organic methods, no of chemical use is permitted due to the student body working in the garden and for ecological reasons (Homoktövis 2019).

5.2.2 Establishment and current management of the garden

The school had a learning garden between 1990 and 1995, when gardening was incorporated into the agriculture science class with the leadership of a then science teacher.

42

After his retirement, the responsibility for garden management was not taken up by anybody and in the absence of proper maintenance, the garden was abandoned and left uncultivated. For more than a decade the area was a grassy lot with some fruit trees but without teaching-learning purpose (Homoktövis 2013).

The intention to recreate the garden came in 2013 when a tender announced by Telekom, one of the biggest telecommunication companies in Hungary, in collaboration with the Contemporary Architecture Center, offered financial and technical support for establishing an urban community garden on school property. Telekom offered the profit from its annually organised Vivichita charity run, approximately 4.5 million HUF to support garden establishment in 3 schools. The objective of the tender was three-fold, it aimed at endowing schools with a learning garden as environmental education; it addressed the often-problematic summertime maintenance during the long break from June until September (Telekom 2013). This issue inspired the idea of a garden with school plots *and* private family plots where the private plots owners would be obliged to look after the school plots during the summer. This invention also contributed to the third aim of the tender, to enhance community ties within the school community and beyond (Telekom 2013).

The Újpesti Homoktövis Primary School was one of the three winners where work on the garden started Spring of 2013. As part of the tender, the school was offered soil analysis, landscape architecture support, tools and equipment for basic gardening activities, as well as, seeds and seedlings (Telekom 2013). Beyond technical support, the Contemporary Architecture Center also offered education and workshops about basic gardening practices covering a wide range of topics and themes to empower future users with knowledge (Telekom 2013).

While providing equipment and technical support, the tender required the school to guarantee human resources for the physical realisation of the garden as the first step in the

43

community building process. Furthermore, it required the school to provide an opportunity for voluntary and community-based activities in the garden after its establishment (Telekom 2013). Accordingly, the school invited the faculty, the student body and the parent community to volunteer in setting up the garden. Also, the school encouraged parents to lease a plot in the garden for personal cultivation.

The local municipality also contributed to the sustainable management of the garden by opening a gate to the garden's fence, thus providing an entrance separate from the school that could be used by private plot owners outside of opening hours and during the summer break (Homoktövis 2019). The garden also receives flower seedlings from the municipality annually that they use for the decoration of the common areas. Today the established rules work adequately; the 17 garden plots belonging to the school (from now on: class garden plots) are maintained and cared for by the 14 private plot owning families (from now on: family plots) during the summer who also look after the additional common areas, flower and herb beds.

The management of the garden has been the responsibility of the science teacher who initiated the revival of the once flourishing garden program at the school. She prepared the application of the tender, surveyed the needs and wishes of the community regarding education and the landscape of the garden. Till now she has been in charge of the distribution of the class garden plots, garden related events and workshops organisation, summer maintenance management and acted as a link between the school garden and community garden plots. With her retirement this year, these responsibilities now transfer to a small group of three teachers who will jointly perform these tasks.

5.2.3 School garden intervention in reGARDEN

Voluntariness is a core concept in school garden participation – from the teachers', students' and parents' side alike. The garden is not incorporated into the school's core curriculum, every teacher has the opportunity to build it into specific classes but it's not

mandatory even in science and biology classes. Plot ownership is also on a voluntary basis; classes can decide whether they would like to own and cultivate a garden plot in a given academic year. While students have the freedom to decide, teachers have a major role in encouraging students to do so. Therefore, not every class in the school has a plot. Furthermore, there are no rules regarding the maintenance of the plots in the school garden, every class is free to decide how they do or do not cultivate their plot. Due to the lack of supervision and strict regulations, some plots stay with one class for years even when students do not care for it anymore.

The school does not offer extracurricular gardening activities; however, enthusiastic and eager-minded teachers often spend time there and teach interested students during afternoon-care hours. Moreover, the school garden is an integral part of the school's sustainability education agenda developed in accordance with the Eternal Ecoschool criteria, it serves as a location for events, provides ingredients for community cooking, and offers various activities for different world-day themed celebrations that address the whole student body.

Parents' participation is the work of the class garden plots is also welcomed but not obligatory. Usually the home room teacher or the person managing the class garden plot invites parents to contribute to or help in the garden in which everybody can participate on a voluntary basis. Given these circumstances, there is great variation in teacher, student and – more importantly from the perspective of this thesis – parent participation, showing different structures of the small community around each class garden plots.

5.2.5 reGARDEN as a good example

The Újpesti Homoktövis Primary School with its reGARDEN school gardening practice is acknowledged as a good example within the Eco-school community and the Hungarian school garden community and thus gets much attention. The garden hosted the latest Regional Eco School Meeting and applied and was successfully accepted as a mentor garden within the

45

framework of the earlier introduced National School Garden Programmes. As one of the grant winning gardens, reGARDEN received new tools, including manual grass mowers, rain water collector, packs of seeds and new furniture adequate for outdoor classes. As a mentor garden, reGARDEN also supports other, still developing school gardens by offering garden visits, information and know-how sharing and annually organised workshops for teachers during the next 5 years.

6 Experience of Adult Groups in reGARDEN

6.1 Adult groups in reGARDEN

The first aim of the research was to identify the adult groups connected to the garden and observe the form of their participation in it. During the interview period, based on their relation to the school garden respondents could be sorted into three distinct categories: (1) teachers, (2) parents and (3) family garden plot owners. This section presents these adult groups with their main characteristics and connection to the garden.

6.1.1 Teachers and parents

Many teachers are connected to the school garden and play a crucial role in its integration into the curriculum, involve parents and manage cooperation between parents and family garden plot owners. Teachers who work in the garden include science teachers and home room teacher who are the head of each class garden plot. As the garden is connected to their work, they are in constant connection with it. As core actors in these class garden plots, besides managing the garden's involvement in education they also act as a link between the garden and the parental community.

Around every a class garden parental community can build up. These are the parents of students affiliated in the class that owns a garden plot. Their involvement is limited to the class' plot. In some cases parents with several children in the school might be affiliated with more than one class plot; however, on general terms their involvement excludes the management of common places. The structure and density of communities building up around class garden plots greatly depends on several factors. As mentioned above, participation of parents is on a voluntary basis, therefore, contributing to the work in the garden in any way is based on parents' motivation and availability. In some cases, parents' interest is low while in others the parental community is receptive to providing support and get engaged in the garden work. The

47

following quotes are examples of two very different types of parental attitudes towards the garden:

> (…) nobody joins in. Nobody at any level. There was a discussion that somebody should bring manure. They rather pay their share in the class money so we can buy soil and seeds and do it ourselves. Here it's not that typical [to take part]. (6)

> (…) so there is a really good parental community, so those who can, and who keeps in mind the garden does something for us. And, thank goodness, they are quite eco and "green', so you can rely on them. (3)

Another aspect that greatly influences the participation of parents is the home room teacher's intentions regarding their involvement. The tendency was that parents rarely get involved in the school gardening activity without the home room teacher's outreach – even if motivation and willingness is there from the parent's side. A father articulated his enthusiasm about the garden which was mixed with a fear of ruining somebody's work:

> I was really happy that I could help because I'm glad to help, I just don't like to meddle in somebody else's work (21)

Therefore, outreach and leadership is required for successful involvement of parents. Since there are no rules regarding the involvement of parents, it mostly depends on teachers and how they structure the school garden interventions – some teachers aim to cultivate the class plot with the children while others do reach out to parents to get support or to build the class community.

Parental involvement also needs time to develop. In first grade classes even if motivation and enthusiasm is there both among parents and in the home room teacher, lack of time to organise community gardening events and a not-yet-developed parental community is a reason why parental involvement is low so far. While in classes where gardening has been part of the everyday life of the class for years and a strong parental community has already developed, participation in gardening events is higher among parents

When all these factors are present – parental motivation, teacher outreach, and advanced parental community – parental participation is fostered leading to a high number of parents engaging in the work of the garden.

6.1.2 Family garden plot owners

The school garden offers the opportunity for enthusiastic parents who would like to go beyond working occasionally in the class garden plot to cultivate their own plot. These gardeners are parents of current or former students of the school, including one former teacher and two families who have no such connection to the garden. While their role within the smaller community of the family garden plot owners might be significant, they will be excluded from the study. These parents primarily look after their own garden but as it was agreed at the opening of the garden, they take care of the common areas as well as look after the class garden plots during the summer period including watering, weeding and harvesting.

In addition to being part of the greater network of the school garden, family garden plot owners also create a smaller but more coherent community. They have their own meetings, take part in the decision making and management of the garden including requirements for membership, divide tasks among themselves concerning common area management, agreement on summer maintenance, required tools and equipment etc. While the dynamics within this smaller community as part of the greater network of the school garden would be an interesting aspect to study, this thesis concentrates solely on the learning experience and perceptions of this stakeholder group along with the others, disregarding their experience regarding management.

Table 2. Participation of adult groups in reGARDEN

Adult group	Level of participation	Mode of participation in the school garden		
		Socio-material resources	**Joint enterprise**	**Mutual engagements**
Teachers	Constant participation	• Providing school equipment for gardening	• Bring students to the garden • Do gardening with students, including planting, weeding, watering • Fill up bird feeding boxes • Fill up pollinator bath	• School garden leading science teacher spend a lot of time daily in the garden • Communication with other stake holder groups through email list or Facebook group • Brainstorm with each other about gardening experience
Parents (without own garden plot)	Rarely	• Provide garden furniture • Pallets used for the edges of the garden plots • Fruit, vegetable and flower seeds and seedlings • Lend equipment needed for exhibitions	• Class plot cleaning after the summer season • Community planting in class plot during the spring • More difficult physical tasks such as digging up class plot, wood crafting, building edge for plot, herb spiral building	• Gardening class events • Barbeque class parties in the garden • Academic year opening and closing event • Mailing list discussions
Parents with own garden plot	Constant participation with fluctuating intensity	• Fruit, vegetable and flower seedlings	• Compost management • Rain water container cleaning • Pruning of trees and bushes • Pick up flower packages from municipality • Plant flowers • Weed, water common areas • Summer maintenance of class garden plots	• Ad hoc interaction with other members of this stakeholder group • Brainstorm with each other about gardening experience • Ask help from each other regarding planting • Regular community meeting to discuss management issues • Facebook group for communication

6.1.3 Adult groups' participation in reGARDEN

The different ways these adult groups are connected to the garden also defines the mode of their participation (Table 2). In reGARDEN, there are precedents for adult group participation in connection with all three core elements of Wenger's community of practice theory (Table 2). Teachers running the class garden plots are in constant connection with the garden, guiding students' learning experience and manage the tasks children can do such as watering plants, weeding, winter feeding of birds, and providing water for birds etc. At the same time, they also manage parents' involvement in the garden, ask for support if needed through email list or parental meetings and attend class gardening events. For the improvement of the garden, class plot leading teachers and others who integrate the garden into their subject curricula often brainstorm and change information about best-practices.

Parents' participation is not as frequent and it greatly depends on several factors as elaborated above. However, those parents who do get involved, contribute to the garden in many ways. The most basic form mentioned was providing material resources to the class plot though purchasing or donating plants or tools. These contributions are often connected to parents' job or free time giving an example of how individual participants can bring novel practices to the community, thus enhancing its competence and building its social memory (Barthel 2008; Wenger 1998). A couple of examples illustrates this. For instance, a mother offered many pallet panes to the garden which became unwanted at her work place. The panels were distributed among gardeners – class and family plots alike – and were used as the edges of the plots to easily distinguish them from one another. Another parent donated tomato seedlings to her daughter's class garden because she could not plant all of them in her home garden. A father does who wood crafting at home as a hobby and offered his help to install the pallet panels.

„The design and implementation of the garden plot edges… we made the edge of the garden plot from pallet panels and then the dimension, cutting and implementing of the pallets, so physical tasks like these." (20)

This shows how parental participation even only at the socio-material level can contribute to the development of community practices.

A more direct way of involvement is parents' participation in actual gardening activities. These often include more difficult physical work students are not able to do and take place as part of community events of the class when teachers, parents and children can mingle and talk to each other. Some classes traditionally organise a school year opening and closing event with joint cooking and gardening activities that have community building power as well. Preparation for events like this can be organised through email or through parent-teacher meetings, depending on the class.

Once there was a bigger task that E. initiated – she wanted to dig up and rearrange the whole lot, and then she asked for technical help. (21)

Participation of family plot owners in the garden differs from teachers' and other parents'. Due to their own lots, members of this stakeholder group visit the garden on a more regular basis; however, their activity there concentrates primarily on cultivating their own plots and common areas. They mostly contribute to the sustainability of the garden through joint labour that covers taking care of the compost, pruning of trees and bushes, planting flowers into common areas, weeding and watering. These tasks are complemented by the maintenance of the class gardens during the summer period. So far task distribution happened at one of their meetings and afterwards everybody worked separately. This temporal segmentation of responsibilities is a general feature of management which is revised on the annual meeting at the beginning of the Summer. Communication between gardeners happen sometimes ad hoc during evening watering or in random meetings at the garden. The individual communication platform of the family garden owners is a private Facebook group which also includes teachers

responsible for the garden, thus they can mediate issues of the class plots with the whole garden management.

6.1.4 Adult groups in reGARDEN community of practice matrix

Figure 4. Community of Practice matrix of reGARDEN with adult groups' location within it. Based on Wenger (1998).
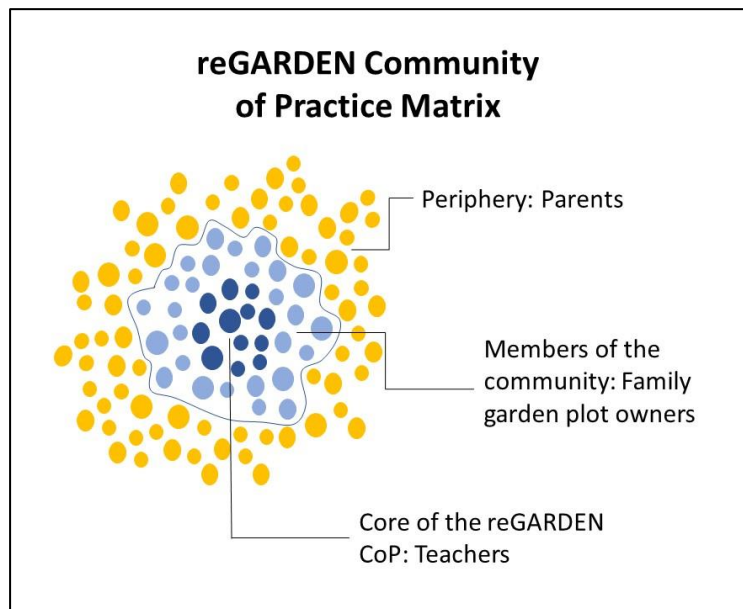
Considering the identified adult groups and the level and nature of their participation, parents, teachers, and family garden plot owners were placed on community of practice matrix of reGARDEN (Figure 4).

Teachers are identified to be in the core of the garden's community of practice with their constant participation. Moreover, their managerial role in the garden, responsibility to define the boundary of the community, as well as, providing (or not) channels through which external actors can join make them full members of reGARDEN CoP (Wenger 1998). Family garden plot owners also belong to the garden's CoP – thus indicated by a different shade of the same colour – as they are permanent members of the garden, responsible for common area maintenance and also contribute to the decision-making and management of the whole garden. Accordingly, they have shared practice and interest regarding the garden (Lave and Wenger 1991).

Parents, on the other hand, are in a looser connection with the garden and participate when there is a need or a chance is offered. Their involvement, in most cases, goes beyond mere observation and involves direct engagement, but without the demands of full membership

(Wenger 1998). Parents' involvement is occasional and voluntary which keeps them in the periphery of the reGARDEN CoP.

Two important aspects have to be noted concerning the above introduced CoP matrix. First, as it can be seen the shape of Figure 4 is not perfect circle. The arrangement of the figure reflects the wide range of degrees and ways an actor – members and non-members alike – can be linked to the community of practice. For this, a good example is a family garden plot owner, who acts as the right hand of a class plot leader teacher, playing a crucial part in its managing work, and leading gardening workshops for children, organising community events and inviting and coordinating parents for garden work and acting. Therefore, on Figure 4, she or he would be situated closely to the inner dark blue circle, while somebody else, less active family plot owner would be on the boundary between the CoP and its periphery. Secondly, it is important to note that while this thesis does not discuss the student body within this CoP matrix, they are indeed part of the community. The researcher acknowledges the significance and place of students within reGARDEN CoP; however, due to the narrow focus of this study on the adult groups, the student body is excluded from the CoP model.

6.2 Learning experience of adult groups

After the identification of the adult groups linked to the reGARDEN, the study aimed at detecting their learning experience. I found that similarly to Bendt et al. (2013), the learning of adults taking place in the reGARDEN can be categorised into four learning streams: (1) local ecological knowledge, (2) environmental elements and processes, (3) new skills, and (4) personal development. However, the combination and intensity of these learning streams are greatly differ between the adult groups (Bendt et al. 2013) (Table 3).

Table 3. Learning Experience of adult groups in reGARDEN.

Adult group	Prior knowledge	Learning Experience			
		Gardening and local ecological conditions	Environmental elements and processes	New skills	Personal development
Teacher	Childhood memories or no prior gardening experience	• Sandy, poor quality soil lack of nutrients • Vegetables suitable for given environmental conditions • Organic gardening method	• Differentiation of plants and wee • Harvesting period of different plants to grow in the garden • Specific plants: sea blackthorn, quince • Synergy between plants - acting as natural pesticide • Discovery of resident spider species		
Parents (without own garden plot)	Childhood memories - knowledge gained from parents/grand parents	• Organic gardening method	• Importance of garden management practices such as watering (limited) • Sense of planting season (limited)	• Building herb spiral (limited)	• Develop a sense of responsibility for what is planted
Parents with own garden plot	Childhood memories - knowledge gained from parents/grand parents Job connected to agriculture	• Vegetables suitable for given environmental conditions • Sandy poor quality soil lack of nutrients - water dissolve quicker • Recognise and identify different plant diseases • Organic gardening method	• Slow pace of environmental processes • Significance of weather -- become more aware of its impact and notice change in weather patterns • Sea blackthorn		• Develop sense of responsibility for what is planted

The cross comparison of the different adult groups showed that the learning experience of each group can be ascribed to their situation in the reGARDEN CoP matrix while also influenced by prior knowledge and experience with gardening. Accordingly, teachers and family garden plot owners show shared learning experience in the same categories, in contrast with parents who only occasionally join in. Each learning stream of a given adult group is introduced and analysed below.

6.2.1 Gardening and local ecological conditions

Respondents from all three groups reported that their knowledge about organic gardening has developed significantly and they have a greater understanding about the dos and don'ts in an organic garden. Except one respondent who was highly suspicious about organic gardening method, actors who mentioned this, referred to it as an interesting opportunity to widen their horizons.

Local ecological conditions is an umbrella term covering the environmental, geographic and ecological characteristics of a given area (Bendt et al. 2013). It includes, among others, soil quality, wind and rain patterns and the climate of the garden. Most respondents from the teacher and family garden plot owner groups identified poor soil quality as the most significant condition of the garden to which gardening practices have to be adapted. The sandy soil with low levels of nutrients impact the choice of fruits and vegetables for cultivation and also affect planting and watering. One of the family garden owners articulated this problem and how they tried to address it:

> Yes, really [sandy the soil]. There is already a lot of nutritient-rich soil in there. Every time when we're planting, he [her father] adds nutrient-rich soil and then that helps retain the water. Because in sandy soil it just evaporates. This is why in a lot of places things dry out. (17)

A teacher without prior gardening knowledge, only the childhood memory of her grandparents' garden summarised all the things she learnt about the gardening and the ecological conditions:

One has to realise that if he wants to plant something…back then I didn't even know what a weed is and what the seedling is. So this is where it begins. [One has to learn] that the soil has to be renewed and fertilized regularly, and what plants can grow here and what is needed for the cultivation of the tomato and the paprika. And that what plants are worth planting there. Then I learnt a lot in general, not to use pesticides, and which plants save us from snails and moles. (3)

Other than organic gardening methods, parent respondents did not indicate any knowledge they gained about gardening or the ecological conditions of the garden, which can be the result of their background knowledge and occasional contact with the garden. Six out of eight parents reported they grew up in the country side or in single family house where connection with the land was usual through parents or grandparents who fostered their environmental education by showing gardening techniques. As mentioned by Bendt et al. (2013), as a boundary process, learning of something new occurs when the experience and social competence of the individual does not overlap with nor is it entirely separate from the community's experience and social competence. Thus, parents with advanced gardening skills were less likely to learn new information through activities in the school garden. On the other hand, due to their occasional participation, they might not face the disadvantages and difficulties low soil quality can present nor do they directly experience the damage diseases or pests can cause.

6.2.2 Environmental elements and processes

While environmental elements and processes are closely linked to the ecological conditions of the garden, participants mentioned quite a few specific details which made it reasonable to categorize them separately. Environmental elements indicate flora, fauna and additional elements in the garden fostering these such as nests for birds, natural water supply for pollinators etc. (Lin et al. 2018). At the same time, environmental processes includes all plant-soil-water processes and natural pest management (Lin et al. 2018). One of the most fundamental knowledge previously unexperienced teachers gained in this learning steam was the differentiation between weeds and cultivated plants at the early stages of plant

development, as well as, the harvesting period of each fruit and vegetable. Building on this knowledge they are able to pass it on to students thus fostering their environmental education.

Linked to organic gardening, teachers and family garden owners highlighted knowledge they gained about natural pesticides and plants, which are in synergy and protect each other from pests like fungi or moles. Regarding environmental elements, teachers and family garden plot owners mentioned the sea blackthorn, the eponym of the school. The sea blackthorn bushes were planted after the reopening of the garden and a workshop was offered to teachers, students, parents and family plot owners about the characteristics of the plant.

> And so I learnt a lot about this sea blackthorn, although I knew nothing about it except that I had seen it in jam and juice form, but how it looks and what its characteristics are I didn't know. (4)

In addition to environmental elements, some family garden owners gained knowledge about processes such as weather patterns and their reliance on them. One family garden plot owner also mentioned that since her harvest in the school garden depends on the weather, she has become more attentive to weather changes and re-evaluated the impact extreme weather events can mean for farmers.

> (…) and the weather, of course. (…) Because when one is just sitting at home he does not think about that. But here you do because as soon as we plant our seedlings, we don't do anything but check the weather and then we realised that it is more extreme than before. And, somehow you know, when they always say in the news that farmers have a tough time because the hail ruined [their crops], and we always just hear this but now we also experience it. (10)

This shows how work in the school garden can directly develop a sense of dependence on nature and make people more conscious about environmental changes and issues. Also, it broadens the understanding of risk and criticalities – what if seedlings are not watered or exposed to extreme heat or low nutrient levels.

Three out of the four interviewed family garden owners mentioned the pace of the plant growing process and their impacts on it regarding learning about environmental processes. While in theory they knew that the growth of any kind of fruits, flowers or vegetables is a time consuming process, they got hands-on experience of its real pace in the garden which comparing to the hustle of their everyday life was a great change. Furthermore, they gained better understanding about the complexity of plant cultivation including many factors which are out of the gardeners' control. This realisation also contributed to their understanding that humans are not rulers of nature's processes rather we are in a symbiotic connection with it.

> And maybe you also have to learn that it is a slower process in the garden. The fact that even if I plant it won't be ready immediately in our speed-up life but you have to care for it and then, only if everything turns out good, the weather and if you take care for it, then there may will be fruit and there will be a miracle. (10)

In contrast with teachers and family garden plot owners whose knowledge about environmental elements and processes has grown during their engagement in the garden, parents showed limited learning experience in this category. Two respondents from this group reported that as a result of their rare contribution in the garden, now they have a better sense of the necessity of garden management practices such as regular watering of plants as well as about the planting season of certain vegetables.

6.2.3 New skills

Parent respondents affiliated with one particular class garden plot highlighted the building of a rock spiral for herbs as a significant activity they took part in that brought new learning experience. With the exception of the parent who organised the gardening event, nobody had prior experience in how to build a rock spiral; therefore, it was a novel practice for them offering learning opportunity. One mother directly identified this new skill as the result of her participation in the school garden.

> Well look, when we built the rock garden, that was quite a big task, I have never done anything like that before. (…) So now, I could easily make one like that. But I don't have

59

any qualifications which would be connected to gardening, it comes only from my personal experience. (17)

Regardless of this particular skill, no other respondent specified any other competence they gained in the garden other than gardening which was discussed in section 6.2.1.

6.2.4 Personal development

In additional to the environmental learning streams introduced above, respondents from the parent and family garden plot owner groups mentioned personal development aspects to which their work at the school garden contributed. One of the parents referred to the "law of the seed" that teaches about the responsibility one has when cultivating a plant. It requires dedication and constant care that makes the garden a metaphor for everything in life:

> (…) so, that I plant it and I care for it and that will have an outcome. And that applies to everything, not only gardening but studying or any other achievement what we want to reach; that we have to plant it, and if we took care of it right and waited long enough and of course time is also needed for it because a carrot won't be ready in two days in the garden then it will have a result. So, I think this teaches taking responsibility in every way. (18)

This shows that besides the environmental learning, school gardening also has the potential to contribute to the personal development of adults as well as students.

6.2.5 Notes on learning experience

Based on the above introduced learning streams each adult group experiences, in some aspects parents' experience greatly differs from the learning of teachers and family garden owners. This can be ascribed to the different degree of involvement and the result of the different learning opportunities available to the groups. As mentioned in Section 5.2.2., at the re-establishment of the garden workshops were offered for teachers and the interested parental community who took active part in the building of the garden. Many of the family garden lot owners were already involved in the garden at that time, and thus attended these open lectures about tomato planting, or the sea blackthorn – which explain why so many respondents out of these two groups mentioned that as a novel environmental knowledge. On the other hand,

however, none of the parent respondents was in connection with the school when the garden was established; therefore, they did not have this direct type of environmental education which brought so specific knowledge for the other two groups.

In addition, as Bendt et al. (2013) argues most of the learning in everyday settings is coming from practice, without the conscious realisation of the actual learning taking place. Experience gained through such practice therefore is often unrecognised and difficult to articulate when respondents are asked about their experiences in the garden. A parent even articulated this dilemma, said that there must be something that he learnt from the participation; however, he could not pin point it. Moreover, there were many cases when respondents had a hard time answering the question "Have you learnt something during your involvement in the school garden? And if yes what?" However, during the interview many types of experience and novel knowledge was mentioned to other questions. The parent, for instance who reported higher attentiveness to weather patterns mentioned this to a general question instead of question on learning experience. To sum up, these aspects have to be taken into consideration when measuring the learning experience of adult groups in school garden besides the degree of their involvement.

6.3 Added value of reGARDEN for adult groups

The main objective of this thesis was to explore the learning experience of adult groups at a school garden, through the analysis of reGARDEN; however, during the interviews, respondents mentioned various other ways they benefit from participating in the school garden which also shows the potential of school gardens in raising environmental awareness and strengthening urban sustainability. I grouped these added values into three categories according to their themes: (1) recreation, (2) community building, and (3) mindset or behavioural change (Table 4). This section introduces the added value categories with respect of each adult groups.

Table 4. Added values of the school garden from adult groups' perspective.

Adult group	Added-values of the school garden		
	Recreation	**Community building**	**Mindset/Behavioral change**
Teacher	• "Switch off" • Breaks monotony of the school	• Community strengthening • Meeting new people	• Enhance environmental conscious lifestyle
Parents (without own garden plot)	• "Switch off" • Health benefits • Joy of creation • Reconnection with nature	• Bring together like-minded people • Community strengthening • Develop friendships and partnerships beyond the school garden • Place of community events	• Purchase of organic fruits and vegetables from local farmers • No uptake of eco-friendly lifestyles and habits (selective waste collection, reduce household waste, refuse single use plastic if possible, reduce resource use) prior gardening Activities connected to nature
Parents with own garden plot	• "Switch off" • Joy of creation • Reconnection with nature • Health benefits • Pleasing for the eye	• Bring together like-minded people • Community strengthening • Place of community events	• None - eco-friendly lifestyle and sustainable habits (selective waste collection, reduce household waste, refuse single use plastic if possible, reduce resource use) were prior gardening started • Urban space "greening" habit developed

6.3.1 Recreation

Many respondents mentioned one or more recreational effects, including mental. The most frequently indicated advantage was that gardening completely "switches them off" and helps clear their minds, distress and enhances mindfulness. Gardening shuts down thinking about problems and the stress of everyday life, in which physical contact with the soil or other environmental elements is crucial. One teacher, a parent and a family garden owner also connected the physical work with the soil with the calming effect of the garden:

> Yes, and A. also said that the two of us are digging the ground and there is indeed something meditative in it. (9)

> It completely relaxes me when I dig the ground, but really it immediately switches me off. (…) Moreover, in the Spring the first time in the garden is a remedy (10)

These quotes are in line with the theory of Krasny and Tidball (2009) and Turner (2011) who argued for the positive impacts direct physical link – "embodied participation" – with a natural element can bring. Apparently, this effect does not occur only in traditional community gardens but also in school gardens – for full members and actors on the periphery alike.

Regarding recreation, one of the teachers mentioned that with the garden education got a new dimension in the school which is not only refreshing for students but also for teachers, breaking the monotony of teaching in a traditional school setting. After having the school garden intercorporated into her classes for a while now, it would be missed if she did not have this opportunity. The school garden also serves as a break from the usual working environment for parents and family plot garden owners. Respondents from both groups mentioned that the garden offers a change of scenery, some physical activity outside in fresh air which contributes to their well-being.

For most parents and family garden plot owners, participation in the school garden also gives the joy of creation. Through the growing season, family plot owners can see the instant

result of their work which can be the weeding of a plot, planting and harvesting or the building

of a herb spiral from rocks. Respondents reported that these activities fill them with satisfaction

and the sense of *creating something meaningful* – which is often missing in their regular job.

> For this, for the joy it provides, for the outcome, that there will be a harvest or not, because it also happens that it doesn't work. I don't know, for the activity, for itself. So, it's not necessarily the profit. Bu I think it is useful, it has a meaning. It's good to do something that makes sense. This makes me happy already. (18)

In addition to that, respondents from both the parent and family owner garden groups

saw school gardening as a way of reconnecting with nature. While the interview question list

cautiously avoided questions directed at perceptions on extinction of experience or nature-

deficit disorder, respondents draw a parallel between school gardens and the phenomenon of

alienation from nature. This shows that people who experienced life in the country-side and in

urban areas as well can feel the effects this transition on human-nature relationships and

acknowledge that more effort is needed to maintain this relationship in changed social settings

(Clayton et al. 2017). One mother respondent believes that due to the hustle and bustle of the

city, people have very little connection with "mother nature" which can be enhanced through

gardening. Another mother who grew up in the country-side and moved to the capital later also

had the same experience:

> I also learnt a lot of new things from my previous colleagues when I worked with them. Regarding new things that I couldn't have imagined that people in the city don't know or don't do things like these. (17)

Reconnecting with nature could also be seen on the attentiveness and appreciation

respondents showed towards the garden. One family garden owner developed strong emotional

connection to nature and often referred to flowers and the environmental process of plant

evolution as miracle.

> (asked about why she joined the school garden) "For me it wasn't even a question that yes. A huge yes. By the way any time when I… you see my tears are rising talking about it. That's all." (10)

Her affectionate emotions for the garden and nature in general also reflects the sense of place attachment and the spiritual dimension of human-nature connection.

6.3.2. Community building

All three adult groups in the reGARDEN highlighted the community building capacity of the school garden; however, each represent a different perspective. Teachers welcomed the positive impact the school garden has on teacher-parent relationship. In the school garden there is a chance for more informal and deeper discussions with parents which builds trust and enhances collaboration between teachers and parents.

Parents also highlighted the sense of community as a benefit of the school garden along with others. They see school gardening events as occasions where they can meet like-minded people. Since participation is voluntary, only interested parents take part who have shared interests and willing to engage in joint enterprise (Wenger 1998). These gardening community events are also ideal to strengthen community bonds between parents in the same class, thus enhancing the sense of community among parents (Norris et al. 2008).

From acquaintances like these, friendships can develop which can go beyond the school garden setting contributing to the community's resilience. One parent elaborated on how friendships evolving like this with other mums in similar life situation and shared mindset were of great support in managing as a new mother in the changed social setting of today. Co-dependence and cooperation developed naturally in that micro-community providing social support for each other which positively affects their mental well-being and enhance their ability to cope with difficult situations (Norris et al. 2008).

The positive feeling of belonging was also mentioned as an added value which often inspired participation in the school garden programmes as well. Many parents and family garden owners saw themselves as social people who enjoy being part of a community.

65

Specifically, one of the parent respondents expressed that belonging to a community gives her the sense of security which was the driving force for her to actively participate in her son's class gardening events and get to know other parents. The school garden offers an opportunity for this thus enhancing the cohesion of the school garden community including all three adult groups.

Additionally, reGARDEN is a place of get-togethers – for the community, personal family events or even large scale festivals that include the whole neighbourhood. Classes with garden spots regularly organise garden parties, academic year opening parties, barbeques or farewell parties for teachers. These not always include actual work, but attendees can observe the richness of the garden – offering another channel for boundary interactions (Wenger 1998). Furthermore, by linking these events to the garden, attachment to place can develop in participants which increases the emotional attraction to the garden and nature in general (Barthel 2008). This sense of place can be seen in the case of one family plot owner for whom the garden serves place for their annual end of summer barbeque they celebrate with another family who were once family plot owners, but not anymore. She stated this routine while there would be other alternative places for the celebration in the neighbourhood, they had never considered relocating from the garden as it became an integral part of the barbeque by now. Another example of such cultural-building event came from a teacher who regularly celebrates her son's birthday in the garden. This way even people who are not in direct connection with the school or the garden per se can get an insight into gardening and experience a more natural landscape in the residential area.

6.3.3 Mindset and behaviour change

Some of the questions were to explore participants' perceptions on gardening and environmental conscious thinking. More than half of the interviewed adult group representatives said that eco-friendly lifestyle – including recycling, composting, preference

66

for local farmers' products – and genuine appreciation and love for nature was a motivator to take part in school gardening than an added value. Nevertheless, other respondents explained that their engagement in the garden made them more conscious about environmental issues and their role in addressing them or mutually enhanced other environment-related habits and activities. One of the teachers said that her involvement in the school garden guided her transition to a more environmental conscious lifestyle and made it more targeted including paying attention to her carbon footprint. A parent inspired by the garden joined an eco-community and together with other families orders fruit and vegetable boxes from a zero waste and organic grocery shop, thus reducing costs and food that goes to waste.

Other respondents while were not able to identify any new habit as a result of their participation in the school garden, mentioned many activities which are closely linked to and indirectly could have been affected by the school garden. One parent expressed that her son become highly interested in birds and as reGARDEN holds the title of Bird Friendly Garden received from the Hungarian Ornithological and Environment Protection Institution, they applied for membership in the institution to attend workshops and learn more about birds. While she did not mentioned direct causality between their involvement in the garden and wish to join the institution, she acknowledge that these were in some way connected. At the same time, a family garden plot owner expressed a direct effect the garden had on her view of urban space. She said when she sees a neglected flower box or small lot on the streets, she feels the urge to "green" it.

> When I walk around on the streets and I see an empty plot or weedy place, I have this urge
> to start weeding and plant some flower seeds there. (9)

In addition, she added that she became more sensitive to trash on the streets and recycling. All these experiences indicate that even if participants in general have multiply environmental conscious habits, physical involvement and learning in the school garden can further enhance

67

their understanding of ecological processes and environmental issues even beyond the garden (Bendt et al. 2013).

6.4 Discussion

The reGARDEN case study shows that school gardens have the potential to promote learning and enhanced environmental knowledge beyond its student body among participating adult groups. Similar patterns can be seen regarding adult groups' learning experience in the reGARDEN than the research on community gardens present with some unique features about environmental learning and improved social resilience (Andersson et al. 2007; Barthel et al. 2010; Bendt et al. 2013; Krasny and Tidball 2009; van der Jagt et al. 2017).

6.4.1 Environmental learning of adult groups

As the study revealed, unlike community gardens, in a school garden, different adult groups get involved in different degrees which determine their contribution and learning experience, as predicted by Wenger's (1998) theory of communities of practice and its peripheral connections with external actors. Teachers and family garden plot owners have closer connection with the garden on a regular basis and showed the greatest environmental knowledge gain in all the learning streams of local environmental conditions and environmental elements and processes. On the other hand, parents with limited access and less frequent participation presented lower levels of learning in terms of local environmental conditions. However, direct participation and embodied relation with the garden gave even these parents also the opportunity to widen their knowledge about environmental elements and processes in general (Krasny and Tidball 2009; Turner 2011). While the difference between each adult group's learning experiences is significant, since respondents from all three categories reported some improvement, school gardens can potentially increase even peripheral participants' environmental knowledge and competencies (Bendt et al. 2013; Wenger 1998).

68

With more detailed environmental knowledge, adult groups' awareness of environmental issues and ability to identify ecological changes is also enhanced (Krasny and Tidball 2009; van der Jagt et al. 2017). As the literature on community gardens also suggests, the capacity to advance environmental learning among participants enhance school gardens' role in tackling the extinction of experience, nature-deficit disorder and urban sustainability (Bendt et al. 2013).

6.4.2. ReGARDEN and social resilience

Additionally to environmental learning, the results suggest that school gardens have a significant role in building community bonds and ultimately contributing to the social resilience of the neighbourhood (Norris et al. 2008). The reGARDEN community was described as a pool of like-minded adults who share interests and take part in a joint enterprise. These factors made the garden an ideal setting which improved the sense of community in participants and even developed attachment to place in some of them. Furthermore, the relationships and friendships developed in the garden have the potential to advance even beyond the garden, establish a social support system for the participants (Norris et al. 2008).

Sense of community, attachment to place and social support system jointly contribute to the psychological well-being of participants which is a cornerstone for social capital in community resilience (Norris et al. 2008). Hence, the reGARDEN fosters mental health through its community building efforts which combined with its possible positive recreational impacts and promotion of healthy lifestyles also reinforces the social resilience of the community. This *community* many dimensions of the social networks connected to reGARDEN including both the community of the garden which this thesis illustrated with Wenger's (1998) community of practice model, the micro-communities formed through novel relationships in the garden but not limited to its setting and also the wider community of the whole neighbourhood with reGARDEN in it as one of its locations (van der Jagt et al. 2017). While further research is needed to fully explore the potential of school gardens, contribution

to urban sustainability, the complex community development potential of the reGARDEN indicates a great potential to increase social capital as part of community resilience (Norris et al. 2008).

6.4.3 Prior environmental consciousness – tackling extinction of experience

In contrast with prior expectations, the study revealed that environmental consciousness is a key driving force of adult participation in the reGARDEN rather than an added value of it. Most respondents contributed to or joined the school garden program because they had already existing environmental principles of appreciating and caring for nature. Participation in the garden further advanced their ecological knowledge and fostered the environmental mindset by making it more targeted and concrete. On the other hand, no respondent claimed that their thinking was drastically changed by the garden or that it motivated a wholesale transition to an eco-friendly lifestyle but it did result in partial behavioural change.

While this suggests limited ability of school gardens to counteract extinction of experience and bring nature close to those segments of the wider society who already lost contact with it, school gardens have great significance for those individuals who wish to rebuild and nurture their relationship with nature. Most respondents had strong childhood memories connected to the country side and gardening and were looking for some kind of substitute of that in the built environment of urban areas (Louv 2008). This nostalgic way of thinking about gardening and time spent in nature encouraged adult participants to take part in the life of the school garden and revive their close connection with nature which faded through the years. Therefore, even if the case study of reGARDEN did not show an ability of the school garden to introduce gardening to adults unfamiliar with gardening and disconnected from nature, it rejuvenated the relationship between nature and those adults who were once closely connected to it. Hence, school gardens can combat the erosion of human-nature connection in urban areas and slow down the expansion of the extinction of experience phenomenon.

7 Conclusion, Limitation, Further Research

This thesis investigated the learning experience of adult groups in a school garden program using research on community gardens as a guiding example. I observed reGARDEN at the Úrpesti Homoktövis Primary School in Budapest as a case study in order to first identify and classify the adult participants and then observe their learning experience in accordance with their connection to the garden. The research kept an open perspective with regard the perceptions and general experience of adult participants in the school garden. This revealed various added values of the school garden which in combination with its potential to enhance environmental learning clearly make school gardens valuable assets in enhancing sustainability.

It is important to note that while this study suggests the potential of school gardens regarding environmental education and social resilience among adult participants, this capacity greatly depends on the efforts of the school to involve external adult actors. Without outreach campaigns targeted at the adult community – a channel through which they can join in – school gardens' beneficial impacts will be limited to the student body. ReGARDEN is an especially good example in respect of external actor involvement with its summer maintenance approach, various events open for the public and by inviting parents to join and support the work in the garden. However, it is likely exceptional and does not at this point represent the general characteristics of the heterogeneous school garden programmes in Hungary.

Accordingly, this research is by no means adequate to offer broader generalization about school gardens' capacity in raising environmental knowledge beyond its walls. However, this thesis aimed to plant a seed for further research in the field of school gardens, revealing the factors more attention should be paid to and highlighting interesting aspects that could be studied in the future.

Based on the results, further research is recommended in the following areas:

Mapping the different types of school garden programmes: broader generalisation could only be drawn regarding school gardens' ability to raise environmental learning with a study observing several school garden interventions. However, the field study of this research made it clear that the scope of school garden interventions are extremely heterogeneous in Hungary which makes comparative analysis difficult. Therefore, research would be needed to classify school garden programs making comparative analysis possible.

Observing adult participants' learning experience with quantitative analysis: a study applying quantitative methods to measure adults' learning experience within the garden would complement the findings of this study and would give more rigour to the results.

Analysing the benefits adult groups can bring to the school garden: This present thesis explored adult groups participation in the school garden from individuals' perspectives, but Wenger's (1998) communities of practice theory suggests that individuals' brought experience and competences can also contribute to the development of the community's memory, practice and overall identity. Thus, a study observing school gardens from the community's perspective would enhance understanding about the interaction between the school garden and involved adult groups.

Observing outreach techniques aiming to involve adult groups in school gardening activities: Adult groups' participation in school gardening greatly depends on whether the school offers any forms of access to its gardening programmes. Therefore, research on these outreach efforts and the factors enabling and hindering them would be beneficial in finding good practices – which later on could be shared with schools running a garden through the Foundation for School Gardens.

Reference List

Andersson, E., Barthel, S. and Ahrné, K. 2007. Measuring socialecological dynamics behind the generation of ecosystem services. *Ecological Application* 17 (5): 1267-1278.

Barnes, M.L., Bodin, Ö., Guerrero, A.M., McAllister, R.R.J., Alexander, S.M., and Robins, G. 2017. The social structural foundations of adaptation and transformation in socio-ecological systems. *Ecology and Society* 22 (4): article 16.

Barthel, S. 2008. *Recalling Urban Nature: Linking city people to ecosystem services*. Doctoral dissertation, Department of Systems Ecology, Stockholm University, Stockholm.

Barthel, S., Folke, C., and Colding, J. 2010. Social-ecological memory for management of ecosystem services. *Global Environmental Change* 20 (2): 255-265.

Bendt, P., Barthel S., and Colding, J. 2013. Civil greening and environmental learning in public-access community gardens in Berlin. *Landscape and Urban Planning* 109 (2013): 18-30.

Berezowitz, C.K., Bontrager Yoder, A.B., and Schoeller, D.A. 2015. School gardens enhance academic performance and dietary outcomes in children. *Journal of School Health* 85: 508-518.

Birky, J., and Strom, E. 2013. Urban perennials: How diversification has created a sustainable community garden movement in the United States. *Urban Geography* 34 (8): 1193-1216.

Blair, D. 2009. The child in the garden: An evaluative review of the benefits of school gardening. *The Journal of Environmental Education* 40 (2): 15-38.

Boyer, L. and Roth, W. 2006. Learning and teaching as emergent features of informal settings: An ethnographic study in an environmental action group. *Science Education* 90 (6): 1028-1049.

Bucklin-Sporer, A. and Pringle, R.K. 2010. *How to grow a school garden: a complete guide for parents and teachers.* Portland, Oregon: Timber Press, Inc.

Clayton, S., Colléony, A., Conversy, P., Maclouf, E., Martin, L., Torres, A., and Troung, M., Prévot, A. 2017. Transformation of experience: Towards a new relationship with nature. *Conservation Letters* 10 (5): 645-651.

Corbin, J. and Strauss, A. 2008. Analysing data for concepts. In: *Basics of qualitative research: Techniques and procedures for developing grounded theory*, 3rd ed. 159-194. Thousand Oaks, CA: SAGE Publications, Inc.

CSERFA Közhasznú Egyesület, 2015. Szakmai tanulmány: „Répa, retek, mogyoró" – a közösségi mezőgazdaság nemzetközi működési feltételeinek adaptálása a hátrányos helyzetű Rimócon, az iskolakert működési feltételeinek továbbfejlesztésével. Accessed: 31st January 2019. URL: http://www.iskolakertekert.hu/images/documents/Tanulmany_Iskolakert_vegl.pdf

Guitar, D.A., Pickering, C.M., and Byrne, J.A. 2014. Color me healthy: Food diversity in school community gardens in two rapidly Australian cities. *Health & Place* 26 (2014): 110-117.

Halbritter, A. A. 2016. Iskolakert a győri Apáczai Csere János Karon. Accessed: 1st July 2019. URL: http://ak.sze.hu/images/Szolgáltatások/Iskolakert/Iskolakert_az_Apaczai_Karon.pdf

_____. 2018. Summary of the National Survey on School Gardens. 2018. Accessed: 1st July 2019. URL: http://www.iskolakertekert.hu/az-iskolakertekrol/2018-as-orszagos-iskolakerti-ovodakerti-felmeres

Heim, S. Bauer, K.W. Stang, J. and Ireland, M. 2011. Can a community-based intervention improve the home food environment? Parental perspectives of the influence of the delicious and nutritious garden. *Journal of Nutrition Education and Behaviour* 43 (2): 130-134.

Holland, L. 2004. Diversity and connections in community gardens: A contribution to local sustainability. *Local Environment* 9 (3): 285-305.

Homoktövis. 2013. Pályázat: reGARDEN – újraKERT. Internal document of the Újpesti Homoktövis Primary School.

_____. 2019. Újpesti Homoktövis Általános Iskola Szakmai beszámolója 2019 – Technical review of the Újpesti Homoktövis Primary School prepared for the 'Foundations Sub-project' of the National School Garden Development Programme. Internal document of the Homoktövis Primary School.

Homoktövis-suli. 2019a. *Ökoiskola program*. Accessed: 9th July 2019. URL: http://www.homoktovis-suli.hu/index.php/zoeld-hirek/okoiskola-program/490-kriteriumrendszer

_____. 2019b. *Zöld hírek*. Accessed: 8th July, 2019. URL: http://www.homoktovis-suli.hu/index.php/zoeld-hirek

Iskolakertekért Alapítvány. 2019a. Accessed: 31st January, 2019. URL: http://www.iskolakertekert.hu/index.php/hu/

_____. 2019b. *Céjaink*. Accessed: 8th July, 2019. URL: http://www.iskolakertekert.hu/index.php/hu/alapitvany/celjaink

_____. 2019c. *Iskolakerti alapozó alprogram*. Accessed: 8th July, 2019. URL: http://www.iskolakertekert.hu/index.php/hu/alapozo-2018-2019

_____. 2019d. *Iskolakertekről*. Accessed: 3rd July, 2019. URL: http://www.iskolakertekert.hu/index.php/hu/tudastar/iskolakertekrol

Johnson, S. 2012. Reconceptualising gardening to promote inclusive education for sustainable development. *International Journal of Inclusive Education* 16: 5-6.

Közösségi kertek. 2019. reGarden-újraKERT Accessed: 5th June, 2019. URL: http://kozossegikertek.hu/garden/ReGARDEN-ujrakert/

Kónya. Gy. 2018. The impact of out-of-class activities on the environmental attitude of high school students. *Journal of Applied Technical and Educational Sciences* 8 (2): 21-35.

Krasny, M.E. and Tidball, K.G. 2009. Community gardens as context for science, stewardship, and civic action learning. *Cities and the Environment* 2 (1): article 8.

Lave, J. and Wenger, E. 1991. *Situated learning: legitimate peripheral participation.* Cambridge: Cambridge University Press.

Lee, V.N. No Date. Community gardens. Accessed: June 26, 2019. URL: http://depts.washington.edu/open2100/pdf/2_OpenSpaceTypes/Open_Space_Types/cgarden_typology.pdf

Lin, B.B., Egerer, M., and Ossola, A. 2018. Urban gardens as a space to engender biophilia: Evidence and ways forward. *Frontiers in Built Environment* 4: article 79.

Louv, R. 2008. *Last child in the woods.* Chapel Hill, North Carolina: Algonquin Books of Chapel Hill.

_____. 2011. The nature principle: Human restoration and the end of nature-deficit disorder. Chapel Hill, North Carolina: Algonquin Books of Chapel Hill.

McDaniel, J. and Alley, K. 2005. Connecting local environmental knowledge and land use practices: A human ecosystem approach to urbanisation in West Georgia. *Urban Ecosystems* 8: 23-38.

McKinney, M. L. 2002. Urbanisation, biodiversity, and conservation. *BioScience* 52 (10): 883-890.

Miller, J.R. 2005. Biodiversity conservation and the extinction of experience. TRENDS in *Ecology and Evolution* 20 (8): 430-434.

Naturvation. 2019. Accessed: 8th July, 2019. URL: https://naturvation.eu/

Norris, F.H., Stevens, S.P., Pfefferbaum, B., Wyche, K.F., and Pfefferbaum, R.L. 2008. Community resilience as a metaphor, theory, set of capacities, and strategy for disaster reasiness. *American Journal of Community Psychology* 41: 127-150.

OFI. 2019. Accessed: 9th July, 2019. URL: http://ofi.hu/okoiskola/

Olsson, P., Folke, C., and Berkes, F. 2004. Adaptive comanagement for building resilience in socio-ecological systems. *Environmental Management* 34 (1): 75-90.

Ozer, E.J. 2007. The effects of school gardens on students and schools: Conceptualization and consideration for maximizing healthy development. *Health Education & Behavior* 34 (6): 846-863.

Pahl-Wostl, C., Craps, M., Dewulf, A., Mostert, E., Tabara, D., and Taillieu, T. 2007. Social learning and water resource management. *Ecology and Society* 12 (2): article 5.

Pahl-Wostl, C., Moster, E., and Tabara, D. 2008. The growing importance of social learning in water resource management and sustainability science. *Ecology and Society* 13 (1): article 24.

Patton, M.Q. 2002. *Qualitative research & evaluation methods.* 3rd ed. Thousand Oaks, CA: SAGE Publications, Inc.

Pyle, R. 1978. The extinction of experience. *Horticulture* 56: 64-67.

Ratcliffe, M.M., Merrigan, K.A., Rogers, B.L., and Goldberg, J.P. 2011. The effects of school garden experiences on middle school-aged students' knowledge, attitudes, and behaviours associated with vegetable consumption. *Health Promotion Practice* 12 (1): 36-43.

Reed, M.S., Evely, A.C., Cundill, G., Fazev, I., Glass, J., Laing, A., Newig, J., Parrish, B., Prell, C., Raymond, C., and Stringer, L.C. 2010. What is social learning? *Ecology and Society* 15 (4): r1.

Robins, G. 2015. *Doing social network research: Network-based research design for social scientists*. London: SAGE Publications, Ltd.

Salbe, A. 2017. *School garden guide: how to set up and use organic school gardens for Global Learning and beyond.* Ljubljana: Institute for Sustainable Development.

Skelly, S.M. and Zajicek, J.M. 1998. The effect of an interdisciplinary garden program on the environmental attitudes of elementary school students. *HortTechnology* 8 (4): 579-583.

Soga, M. and Gaston, K J. 2015. Extinction of experience: The loss of human-nature interactions. *Frontiers in Ecology and the Environment* 14 (6): 94-101.

Stokes, D.L. 2006. Conservators of experience. *BioScience* 56 (1): 6-7.

Tabara, D.J. and Pahl-Wostl, C. 2007. Sustainability learning in natural resource use and management. *Ecology and Society* 12 (2): article 3.

Telekom. 2013. Közösségi kertek létesítése – pályázat állami vagy önkormányzati fenntartású budapesti iskoláknak. Access from Telekom.

Turner, B. 2011. Embodied connections: Sustainability, food systems and community gardens. *Local Environment* 16 (6): 509-522.

UN DESA 2019. *World Urbanization Prospects 2018: Highlights* (ST/ESA/SER.A/421). New York: United Nations, Department of Economic and Social Affairs, Population Division

Urban Nature Atlas. 2019. Accessed: 8th July, 2019. URL: https://naturvation.eu/atlas

Újpest. 2019. Accessed: 8th July, 2019. URL: www.ujpest.hu/keruletrol

van der Jagt, A.P.N., Szaraz, L.R., Delshammar, T., Cvejic, R., Santos, A., Goodness, J., and Buijs, A. 2017. Cultivating nature-based solutions: The governance of communal urban gardens in the European Union. *Environmental Research* 159 (2017): 264-275.

Wakefield, S., Yeudall, F., Taron, C., Reynolds, J., and Skinner, A. 2007. Growing urban health: Community gardening in South-East Toronto. *Health Promotion International* 22 (2): 92-101.

Wells, N.M, Myers, B.M., and Henderson Jr., R. 2014. School gardens and physical activity: A randomized controlled trial of low-income elementary schools. *Preventive Medicine* 69: S27-S33.

Wenger, E. 1998. *Communities of Practice: Learning meaning, and Identity*. Cambridge, UK: Cambridge University Press

_____. 2000. Communities of practice and social learning systems. *Organization*, 7(2): 225–246.

_____. 2010. Communities of practice and social learning systems: The career of a concept. In*: Social learning systems and communities of practice,* ed. C. Blackmore, 179-198. London: Springer.

Westley, F., Olsson, P., Folke, C., Homer-Dixon, T., Vredenburg, H., Loorbach, D., Thompson, J., Nilsson, M., Lambin, E., Sendzimir, J., Banerjee, B., Galaz, V., and van der Leeuw, S. 2011. Tipping towards sustainability: Emerging pathways of transformation. *AMBIO* (2011) 40: 762-780.

Young, E., Berkhout, F., Gallopin, G.C., Janssen, M.A., Ostrom, E. and van der Leeuw, S. 2006. The globalisation of socio-ecological systems: An agenda for scientific research. *Global Environmental Change* 16: 304-316.

Zöldkalauz. 2019. *Farkaserdő.* Accessed: 8th July, 2019. URL: https://zoldkalauz.hu/farkaserdo